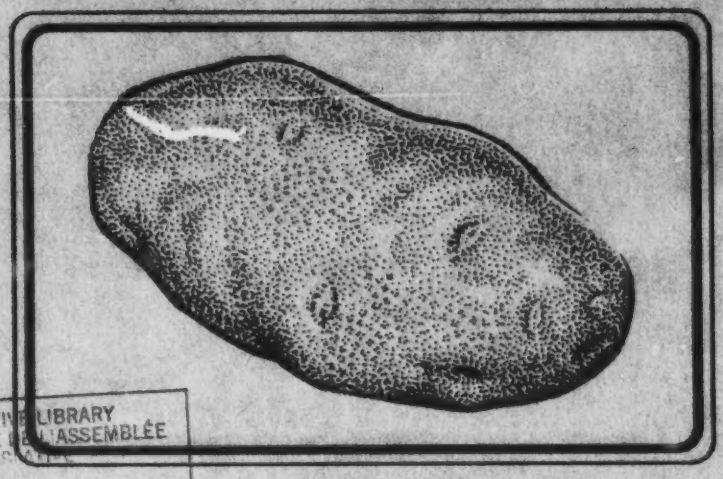

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TECHNICAL REPORTS ON POTATOES
RAPPORTS TECHNIQUES SUR LES POMMES DE TERRE

POTATO CENTRE
CENTRE DE LA POMME DE TERRE
NEW BRUNSWICK DEPARTMENT OF AGRICULTURE
MINISTÈRE DE L'AGRICULTURE DU NOUVEAU-BRUNSWICK

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INTRODUCTION

This is the first report to be published on applied research, surveys and demonstrations dealing strictly with potato crop production in New Brunswick.

I hereby wish to thank all the potato specialists who submitted papers, for their effort; the potato growers whose land and machinery were used, for their collaboration; and the organizations who provided funding for their much needed financial support.

INTRODUCTION

Voici le premier rapport à être publié, qui traite de recherche appliquée, d'enquêtes et de démonstrations concernant strictement la production de la pomme de terre au Nouveau-Brunswick.

Je veux, par la présente, remercier pour leurs efforts, tous les spécialistes ayant contribué des rapports; pour leur collaboration, tous les producteurs ayant participé aux projets; et pour leur support, toutes les organisations qui nous ont fourni une aide monétaire.

Peter S. Jones
Director/Directeur

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THE 1988 GROWING SEASON

George S. Read

ABSTRACT: The growing season for 1988 in New Brunswick was characterized by, a dry spring and early summer with slightly above normal temperatures, followed by a wet August and a cool September.

SAISON DE CROISSANCE 1988

Résumé: Au Nouveau-Brunswick, la saison de croissance 1988 a été marquée par un printemps sec, un été précoce et des températures un peu supérieures à la normale; le mois d'août était humide, et septembre a été frais.

INTRODUCTION: Generalizing the weather conditions for and entire province for an entire season does not explain crop performance on individual farms or even separate regions for the most part. The climate of farms varies significantly from one location to another with such things as frost occurrence, crop development, planting, insect and disease development or harvesting operations. It is therefore necessary to evaluate specific varieties, recommendations and production practices with the most localized or representative information as possible.

Despite these farm scale influences, the overall performance of crops on a provincial scale can often be correlated with major deviations from normal growing season conditions, such as droughts, wet periods, extensive frosts or unusually warm or cold seasons. With these factors recognized, a general summary of the 1988 cropping season weather is presented.

DISCUSSION: The accompanying maps describe the percent deviation of precipitation and temperature from a long term average as interpreted from data collected at Environment Canada climate stations. The precipitation maps were drawn courtesy of the New Brunswick Department of Municiple Affairs and Environment.

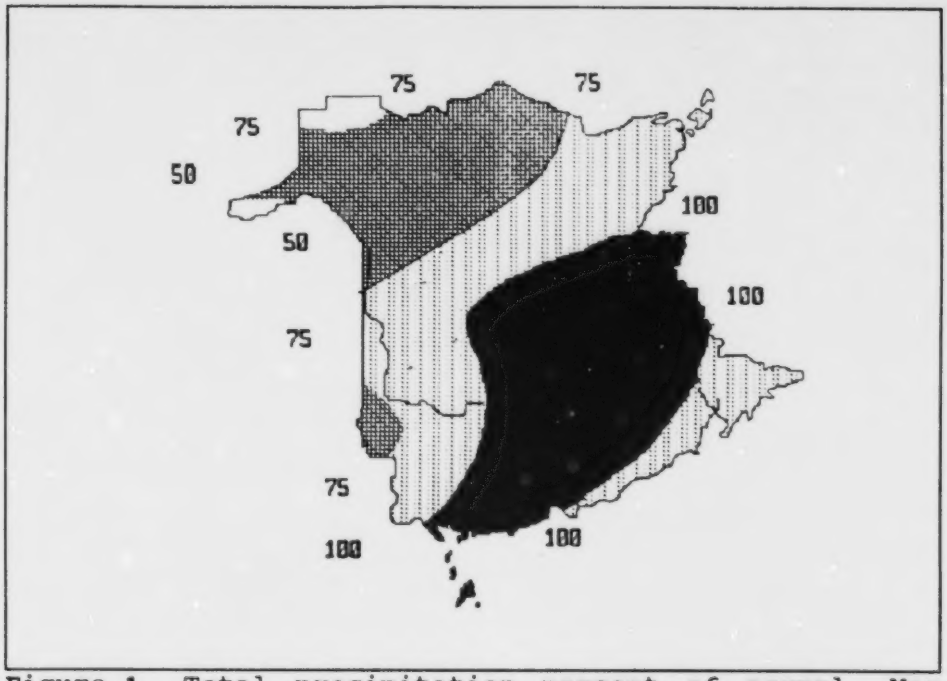

Figure 1. Total precipitation percent of normal, May 1988.

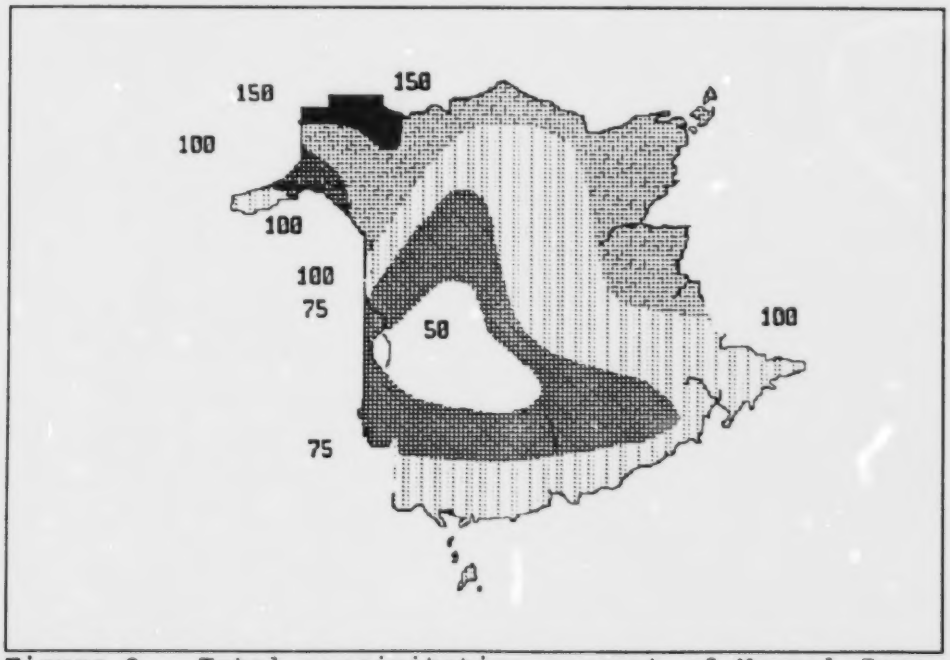

Figure 2. Total precipitation percent of Normal June, 1988.

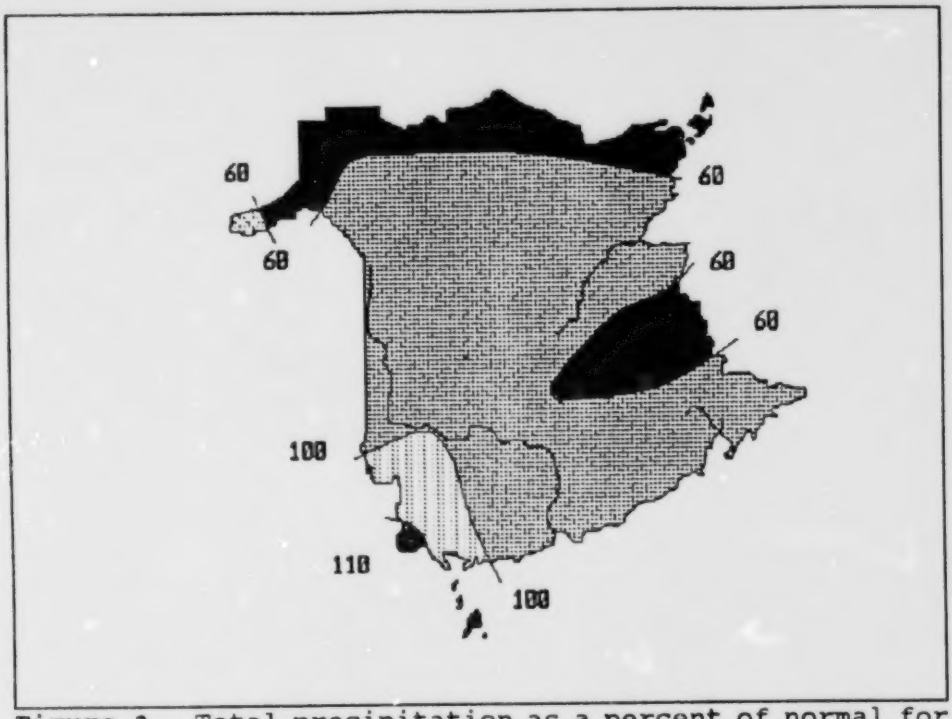

Figure 3. Total precipitation as a percent of normal for July, 1988.

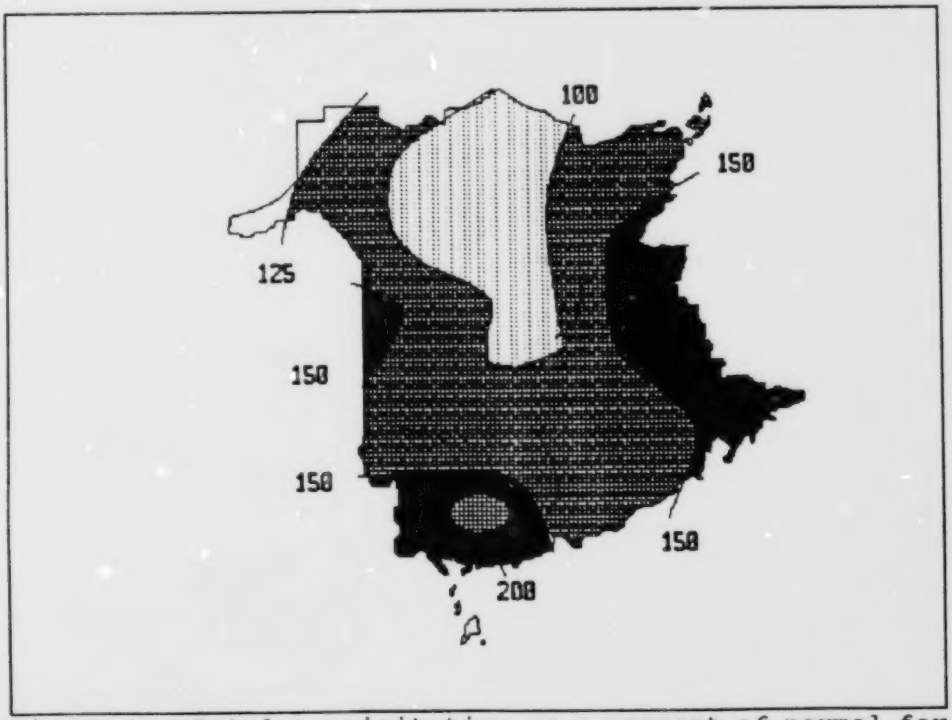

Figure 4. Total precipitation as a percent of normal for August, 1988.

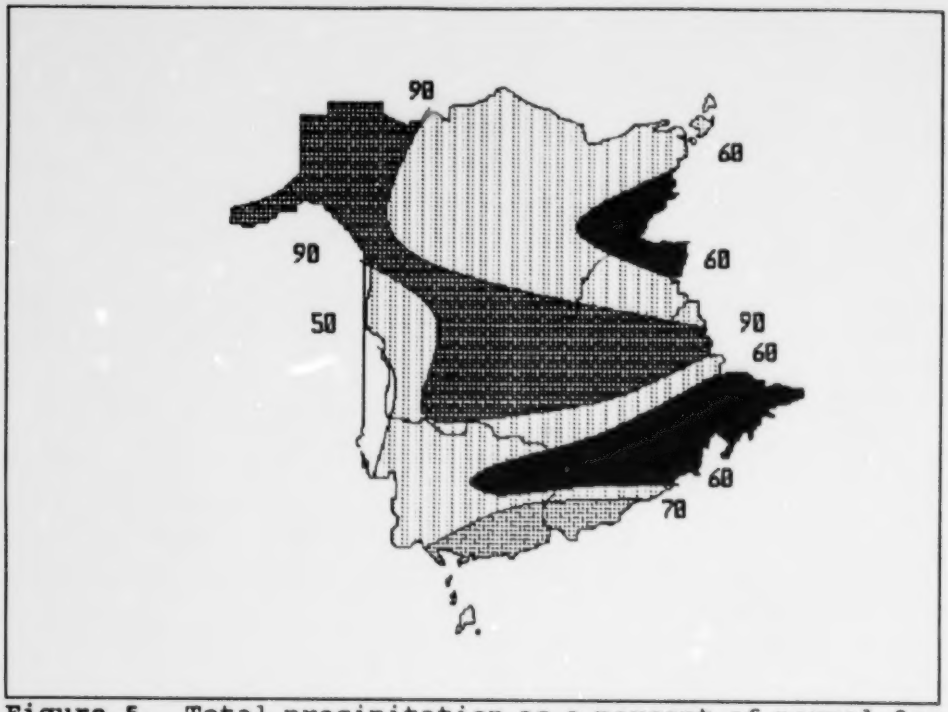

Figure 5. Total precipitation as a percent of normal for September, 1988.

EFFECT OF SEED TYPE AND SPACING ON YIELD OF DESIRÉE CULTIVAR SEED POTATOES

R.P. Hinds

ABSTRACT: The production of Desirée seed was examined using three seed types; small whole seed 30-45 mm, large whole seed >60 mm and cut seed 45 mm with two intra-row spacings of 30 cm and 20 cm. A split-plot design was employed.

Whole seed plots emerged 2-3 days earlier than cut seed treatments and produced a more even stand of growth. Large whole seed >60 mm produced the highest number of stems/plant and tubers/hill than other treatments.

Though not significant, total yield was maximized with large whole seed >60 mm at 30 cm spacings, a result of greater stems/plant and higher tubers/hill.

There were no significant differences in total yield as a result of seed type or spacings per se, though there were significant differences among the various yield sizes between treatments. Large whole seed >60 mm at 30 cm spacing produced significantly better yields of tubers on the desired 35-55 mm range than other treatments.

EFFET DU TYPE DE SEMENCE ET DE L'ESPACEMENT SUR LE RENDEMENT DU CULTIVAR DE POMME DE TERRE DE SEMENCE DÉSIRÉE

Résumé: La culture de la pomme de terre de semence Désirée a été étudiée avec trois types de semence (petits tubercules entiers de 30 à 45 mm de diamètre, gros tubercules entiers de plus de 60 mm de diamètre, et morceaux de tubercules de 45 mm) et avec deux espacements entre les semences (30 cm et 20 cm).

Les plants produits par les tubercules entiers ont émergé de deux à trois jours avant ceux produits par les morceaux de tubercules, et leur croissance était plus uniforme. Les gros tubercules entiers de plus de 60 mm ont produit un plus grand nombre de tiges par plant et de tubercules par sillon que les plants produits avec les autres types de semence.

Même si l'écart de rendement n'était pas très grand, le meilleur rendement total a été obtenu avec les gros tubercules entiers de plus de 60 mm de diamètre semés à intervalles de 30 cm; on a obtenu plus de tiges par plant et de tubercules par sillon.

Le rendement total divergeait très peu selon le type de semence ou l'espacement des plants dans les rangs, mais des écarts appréciables ont été notés dans la grosseur des tubercules selon le type de semence. Les gros tubercules entiers de 60 mm de diamètre semés à intervalles de 30 cm ont produit plus de tubercules de la grosseur souhaitée (de 35 à 55 mm de diamètre) que les autres types de semence.

INTRODUCTION: The recent introductions of yellow-flesh foreign potato cultivars into the New Brunswick system, have created the need to establish management profiles for these new cultivars. Factors which affect yield and quality such as nitrogen rates, intra-row spacings, whole versus cut seed, length of growing season, topkill dates, etc., must be investigated in order to provide producers with the technology required to grow these new varieties and be competitive. Desirée is a Dutch introduction being grown for the Cuban market, which requires tubers in the size range 35-55 mm. This experiment was designed to examine the effects of different seed types and intra-row spacings on the production of Desirée seed for the

Cuban market as part of the process of establishing a management profile for the cultivar.

METHODS: The experiment was a split-plot design with four replicates.

Main plots were:

ST_1 = whole seed 30-45 mm
ST_2 = whole seed >60 mm
ST_3 = cut seed 45 mm

With each seed type, 135 kg/ha each of N, P_2O_5 and K_2O were applied.

Sub Plots were:

S_1 = 20 cm intra-row spacing
S_2 = 30 cm intra-row spacing.

Elite III seed was planted on June 2, topkilled on August 24 and harvested on September 20. Inter-row spacing was 90 cm. Sub-plot size was 0.007 ha. Rotation practice was potatoes, potatoes, potatoes, grain. Soil test was taken prior to planting. Leaf sampling was done at mid-season. The growing season commenced unusually cold for May and June followed by normal temperatures during July and August.

RESULTS: Emergence and Growth: Emergence was 2-3 days earlier in the whole seed plots and as such, there was more rapid growth on the initial stages. This has been confirmed by other workers in New Brunswick (Barclay 1981, Hinds 1987). The large seed type produced a better stand than the other seed types, but among all the seed types, 20 cm spacing plots were more even than 30 cm spacing plots. Throughout the entire growing season, the larger whole seed plots with 20 cm spacing had a better stand.

Counts of stems/plant above ground and tubers/hill were made from selected plots of 50 random plants four weeks after tuberization. Data on stems/plants and tubers/hill are given in Table 1 below:

Whole seed plots produced more stems/plant and tubers/hill than cut seed with the large seed (>60 mm) producing the greatest number of stems/plant and tubers/hill. This is reflected on the yields subsequently to be discussed.

The literature is replete with data showing that plants derived from whole seed produced more stems of even growth than those plants produced from cut seed (Harris,

1978). Indeed, the work of Bean (1978) reported through Harris (1978) showed that the larger the seed size, the greater the number of stems/plant produced and this is supported in our finding.

The results of the soil and leaf analysis taken show that nutrition of the crop was excellent and thus was not a limiting factor in growth, development and yield. Tables 2 and 3 show relevant data.

TABLE 1: *MEAN STEMS/PLANT AND TUBERS/HILL AS AFFECTED BY THREE SEED TYPES AND TWO SPACING LEVELS

Plots Treated	Mean Stems/Plant	Mean Tubers/Hill
Whole seed 30-45 mm and 20 cm spacing	5.3	13.8
Whole seed 30-45 mm and 30 cm spacing	5.4	14.0
Whole seed >60 mm and 20 cm spacing	5.6	16.3
Whole seed >60 mm and 30 cm spacing	6.5	18.5
Cut seed 45 mm and 20 cm spacing	5.4	10.3
Cut seed 45 mm and 30 cm spacing	4.3	11.0

*Mean of 15 locations with 50 random plants

TABLE 2: MEAN SOIL ANALYSIS RESULTS OF MAIN PLOTS PRIOR TO PLANTING -HOLMESVILLE SOIL SERIES

Plots Treated	pH	P_2O_5 kg/ha	K_2O kg/ha	Ca kg/ha	Mg Kg/ha
Whole Seed - 30 - 45 mm	5.6	513+	300	1021	155
Cut Seed - 45 mm	5.7	513+	295	1200	156
Whole Seed - >60 mm	5.5	513+	430+	1415	175

TABLE 3: MEAN LEAF ANALYSIS RESULTS DESIRÉE - MID-SEASON

Plots Treated	%					ppm				
	N	P	K	Ca	Mg	Zn	B	Cu	Mn	Fe
-Whole seed 30-45 mm and 20 cm spacing	6.6	.35	3.6	.86	.55	20	34	16	70	88
-Whole seed 30-45 mm and 30 cm spacing	6.6	.31	3.7	1.1	.59	18	33	16	75	90
-Whole seed >60 mm and 20 cm spacing	6.2	.42	3.1	.82	.55	20	38	16	72	89
-Whole seed >60 mm and 30 cm spacing	6.9	.40	3.1	.72	.46	21	35	16	58	94
-Cut Seed - 45 mm and 20 cm spacing	6.9	.43	2.9	.80	.51	72	30	16	52	102
-Cut Seed - 45 mm and 30 cm spacing	6.6	.34	3.9	1.2	.60	20	40	15	90	92

Yield: Table 4 shows the effect of tne three seed types at two spacing levels, on the yield of various sizes of Desirée seed.

Effect of Seed Type: There was no significant difference in total yield as a result of seed type. However, in the size range 28-35 and 35-45 mm there were significant differences in yield as a result of seed type. In the size range 28-35 mm, yield from small whole seed was equivalent to that from large whole seed but was significantly better than yield from cut seed. In the size range 35-45, large whole seed produced significantly better yield than small whole seed but equivalent yield with cut seed.

Effect of Intra-row Spacing: There was no significant difference on total yield as a result of spacing. However, in the size range 45-55 mm, yield was significantly better at 30 cm spacing than at 20 cm spacing.

Effect of Seed Type X Spacing Interaction: Even though total yield was not significantly different between interactions, large whole seed (>60 mm) at 30 cm spacing produced the highest yield. In the seed size range of

45-55 mm, large whole seed at 30 cm spacing produced significantly better yields than other treatments. Harris (1978) reported that there are yield differences associated with the number of stems/plant as a consequence of seed type. This is confirmed here as the large whole seed produced the largest number of stems/plant and tubers/hill with a higher yield production.

TABLE 4: SUMMARY OF RESULTS

THE EFFECT OF THREE SEED TYPES AT TWO LEVELS OF SPACINGS ON YIELD OF DESIRÉE SEED

	Mean Yield - Tonnes/Hectare SIZES - mm					
Treatments	38-35	35-45	45-53	55-65	>65	TOTAL
1. Seed Type						
Whole Seed 30-45 mm	2.49^{A}	6.35^{B}	11.65	9.53	1.79	31.81
Whole Seed >60 mm	2.01^{AB}	8.31^{A}	11.73	8.60	1.53	32.18
Cut Seed 45 mm	1.41^{B}	6.99^{AB}	11.05	8.78	1.84	30.07
2. Spacing Intra-Row						
20 cm	1.86	7.29	10.81^{B}	9.53	1.71	31.20
30 cm	2.08	7.15	12.15^{A}	8.41	1.78	31.51
3. Seed Type X Spacing						
Whole Seed 30-45 mm x 20 cm	2.25	7.05	11.35^{B}	9.87	1.47	31.99
Whole Seed 30-45 mm x 30 cm	2.73	5.65	11.95^{B}	9.18	2.12	31.63
Whole Seed >60 mm x 20 cm	1.77	7.60	9.45^{B}	9.35	1.63	29.80
Whole Seed >60 mm x 30 cm	2.25	9.03	14.00^{A}	7.85	1.43	34.56
Cut Seed 45 mm x 20 cm	1.55	7.21	11.63^{B}	9.35	2.06	31.80
Cut Seed 45 mm x 20 cm	1.26	6.78	10.48^{B}	8.21	1.61	28.34

Duncan's Multiple Range Test.
Means with the same letter are not significantly different from each other in each class at the 0.05 level.

Table 5 attempts to summarize the effects of seed type and spacing on yield of tubers in the size range 35-55 mm as required for the Cuban market. Large whole seed

>60 mm at 30 cm spacing produced the highest yield and the highest % of total yield in the required size range. Cut seed and small whole seed 30-45 mm produced yield similar to each other.

TABLE 5: YIELD OF DESIRÉE SEED IN THE SIZE RANGE 35-55 MM AT THREE SEED TYPES AND TWO LEVELS OF SPACINGS

Seed Type X Spacing Effects	Yield T/Ha 35-55 mm	% of Total Yield
Whole seed 30-45 mm x 20 cm spacing	18.4	57.5
Whole seed 30-45 mm x 30 cm spacing	17.6	55.6
Whole seed >60 mm x 20 cm spacing	17.05	57.2
Whole seed >60 mm x 30 cm spacing	23.03	66.6
Cut Seed 45 mm x 20 cm spacing	18.84	59.2
Cut Seed 45 mm x 30 cm spacing	17.26	60.9

CONCLUSION: Equivalent total yield can be obtained with small whole seed (30-45 mm), cut seed or large whole seed (>60 mm) at either 20 cm or 30 cm spacing. However, yield was maximized at 30 cm spacing with large whole seed. It is obvious that large whole seed (>60 mm) can be used in the production system after the smaller whole seed is either sold or insufficient quantities are available for planting. There is also greater financial gain to planting large whole seed rather than disposing of them as tablestock at a lower market price. Seed prices are usually higher than tablestock prices.

In addition, a more even stand of crop is produced by the large whole seed planted and with greater number of stems/plant and tubers/hill.

ACKNOWLEDGEMENTS: The writer respectfully acknowledges the efforts of G.P. Coté during the period the work was undertaken.

REFERENCES: 1. Barclay, M. 1981. Personal Communications.

2. Harris P. ed. 1978. The Potato crop A Scientific Basis for Improvement. pp. 299-303.

3. Hinds, R.P. 1987. Effect of Fertilizer Rate, Spacing and Seed Type on Yield of Bintje seed. Adap. Res. Rep. 1987. P.I.B., N.B.D.A.

NITROGEN RATE AND HARVEST DATE ON YIELD OF POTATO CULTIVAR SHEPODY

R.P. Hinds

ABSTRACT: The production of Shepody for processing in the size range greater than 45 mm, was examined under three levels of fertilizer, N - 135 kg N/ha; 168 kg N/ha and 201 kg N/ha and at two harvest dates, the first at 106 days and the second at 117 days post planting. With each level of N, 135 kg/ha of each K_2O and P_2O_5 were applied. Cut seed with an average weight of 60 g was planted with inter-row spacings of 90 cm. Intra-row spacing was 35 cm.

The lowest rate of fertilizer N of 135 kg N/ha produced significantly better total yields than the other treatments. Harvest date produced no significant difference in total yield, but the later harvest had significantly better yields of tubers greater than 65 mm in diameter. For tubers in the required size range for processing greater than 45 mm, 135 kg N/ha at both an early and late harvest produced significantly better yields than other treatments.

Lower N rates produced tubers with higher specific gravity than higher N rates. Earlier harvests at each N level resulted in French Fries of better colour than later harvests. These findings substantiate Agriculture Canada's management profile for the cultivar Shepody and confirms the negative effects of overfertilization with N currently practiced so widely in the industry.

EFFET DU TAUX D'AZOTE ET DE LA DATE DE RÉCOLTE SUR LE RENDEMENT DES CULTIVARS DE POMME DE TERRE SHEPODY

Résumé: La culture de pommes de terre de transformation Shepody mesurant plus de 45 mm de diamètre a été évaluée selon trois différents taux d'application d'azote (135 kg/ha, 168 kg/ha et 201 kg/ha) et selon deux périodes de végétation (106 jours et 117 jours après la plantation). Chaque application d'azote était accompagnée d'une application de 135 kg/ha de K20 et de 135 kg/ha de P205. Des plantons de 60 g en moyenne ont été plantés à tous les 35 cm. On a laissé un espacement de 90 cm entre les rangs.

Les applications de 138 kg/ha d'azote , soit le taux le plus faible, ont donné des rendements totaux beaucoup supérieurs à ceux des autres taux d'application. Aucune différence importante n'a été constatée dans le rendement total compte tenu de la période de récolte, mais les tubercules récoltés plus tard étaient plus gros et mesuraient plus de 65 mm de diamètre. Aux deux dates de récolte, l'application de 135 kg/ha d'azote a donné les meilleurs rendements en ce qui concerne les tubercules de la grosseur requise pour la transformation, soit 45 mm de diamètre et plus.

Les faibles taux d'azote ont produit des tubercules ayant une plus grande densité que celle obtenue avec les taux d'azote plus élevés. Les frites obtenues avec les tubercules de la première récolte avaient toutes une plus belle couleur que celle obtenue avec les tubercules récoltés en dernier, indifféremment du taux d'azote appliqué. Ces résultats appuient la conclusion d'Agriculture Canada pour le cultivar Shepody et montrent bien les effets négatifs d'une application excessive d'azote, une pratique largement répandue dans l'industrie.

INTRODUCTION: During the early 1980's, Agriculture Canada released a new potato cultivar called Shepody with excellent French Fry and tablestock potential. The cultivar had also the tendency in the field to produce oversize tubers, and it was found that tubers over a 1/2 kg were often hollow. In the case of large seed tubers, when these were cut for planting, blind seed sets resulted and in many cases, induced reduced stands.

A management profile published in 1984 for the cultivar suggested the following fertilizer rates:

Seed crop or late August harvest - 675 kg/ha 15-15-15
September 10 harvest - 900 kg/ha 15-15-15 or less
September 20 harvest - 900 kg/ha 15-15-15
Full growing season - 1000 kg/ha 15-15-15

It was noted that the specific gravity of Shepody would be lowered significantly if N fertilization is applied at rates greater than recommended above. As fertilizer N was increased above the recommended rates, the number of oversize tubers increased and, it was noted that as tuber size increased above 400 g, the quality (texture) of French Fries manufactured from those tubers decreased significantly. However, over the past several years, growers who have produced the crop for processing on badly eroded and poorly rotated land, found that yields were low and size of tubers were smaller than the optimum required by the processing industry. This discovery led growers to increase their N fertilization to compensate. N fertilization rates between 108 kg/ha - 250 kg/ha have now become common for this cultivar. The result of this change in recent years has been that higher yields of lower specific gravity were produced but with a loss of colour in French fries. Now, many aspects of potato production are known to affect processing colour out of the field. High sucrose content of tubers is associated with darkening and poor colour of French Fries and chips. The question of colour is a complicated one and Walsh (1986) had suggested ten tips for better chip and French Fry colour in order to introduce some perspectives of the problem. As it relates to processing colour out of the field, five aspects were important for good colour: planting early, lower N fertilizer rates, good maturity of the crop as affected by date of harvest, topkilling the crop slowly and handling the crop gently at harvest.

In the light of the foregoing, this work was undertaken to take another look at fertilizer N rates and dates of harvest and their effect on yield and quality of yield. These factors are easily manipulated by the grower as are date of planting, topkilling and handling at harvest.

METHODS: A split-plot design was used for the experiment utilizing four replicates:

Main plots were:

N_1 = 135 kg/ha nitrogen
N_2 = 168 kg/ha nitrogen
N_3 = 201 kg/ha nitrogen

With each application of N, 135 kg/ha each of P_2O_5 and K_2O were applied.

Sub-plots were:

E_1 = early harvest - Sept. 16th
E_2 = late harvest - Sept. 27th

Foundation cut seed was planted on June 2 and topkilling sprays with Diquat were applied on Sept. 7th and 12th. Harvesting was done by hand to reduce bruising. Inter-row spacing was 90 cm. Seed piece weight was 70 g. Sub-plot size was 0.007 ha. Rotation practice was potatoes, potatoes, potatoes, grain. Soil tests were taken prior to planting. Leaf sampling was done at mid-season.

Sucrose rating was done and specific gravity was calculated on the following basis:

$$\text{Specific gravity} = \frac{\text{weight of tubers in air}}{\text{(weight in air - weight in water)}}$$

Chip colour was determined on an Agtron M 30/31 A unit set on the red position. Colour was recorded both in Agtron units and USDA colour ratings 1-7 corresponding to the appropriate Agtron unit.

The growing season commenced unusually cold for May and June followed by normal temperatures during July to September.

RESULTS AND DISCUSSION: Growth: Soil samples taken prior to planting (Table 1) showed adequate nutrient status of the soil. Up to the time of leaf sampling at mid-season, no differences were observed in growth, flowering date, etc. However, after mid-season, treatments with the lowest N rate of 135 kg/ha began to pale and by mid-August were yellow. This yellowing corresponded with a lower N level in the leaf as well (Table 2). Topkilling was easier in the lower N treatments as well. The highest N level treatments remained green up to the time of topkilling.

TABLE 1: MEAN SOIL ANALYSIS RESULTS OF MAIN PLOTS PRIOR TO PLANTING - HOLMESVILLE SOIL SERIES

Plots Treated	pH	P_2O_5 kg/ha	K_2O kg/ha	Ca kg/ha	Mg kg/ha
135 kg N/ha	5.6	513+	300	1021	155
168 kg N/ha	5.7	513+	295	1200	156
201 kg N/ha	5.5	513+	430+	1415	175

TABLE 2: MEAN LEAF ANALYSIS RESULTS SHEPODY - MID-SEASON

	%					ppm				
Plots Treated	N	P	K	Ca	Mg	Zn	B	Cu	Mn	Fe
135 kg N/ha	6.0	0.39	3.2	0.86	0.44	27	35	20	78	91
168 kg N/ha	6.6	0.39	3.8	1.1	0.54	30	37	22	95	98
201 kg N/ha	6.4	0.44	3.9	0.85	0.49	32	28	20	71	85

Yield: Table 3 shows the effect of two harvest dates at three levels of nitrogen fertilization on the yield of various sizes of Shepody destined for processing.

There was a significant difference in total yield between the fertilizer N rates with 135 kg N/ha being significantly better than the other rates. The processing industry for French Fries requires large oblong tubers and even in the size range greater than 65 mm, 135 kg N/ha proved the best. These findings support the lower N recommendations made in the management profile for this cultivar.

TABLE 3: SUMMARY OF RESULTS

THE EFFECT OF TWO HARVEST DATES AT THREE LEVELS OF NITROGEN FERTILIZATION ON YIELD OF SHEPODY VARIETY

	Mean Yield - Tonnes/Hectare SIZES - mm			
Treatments	<45	45-60	>65	TOTAL
1. Nitrogen Rate				
135 kg N/ha	3.46A	15.98A	16.13A	35.57A
168 kg N/ha	2.50B	16.03A	12.83B	31.36B
201 kg N/ha	3.49A	15.70A	11.80B	30.99B
2. Harvest Date				
Early -Sept. 16	3.18A	17.08A	12.72B	32.98A
Late - Sept. 27	3.12A	14.72B	14.46A	32.30A
3. Nitrogen Rate x Harvest				
135 kg N/ha x early harvest	3.47	16.83	16.45	36.75A
135 kg N/ha x Late Harvest	3.44	15.15	15.80	34.39A
168 kg N/ha x Early harvest	2.53	18.20	11.10	31.83B
168 kg N/ha x Late Harvest	2.47	13.85	14.58	30.90B
201 kg N/ha x Early harvest	3.54	16.23	10.60	30.37B
201 kg N/ha x Late harvest	3.44	15.18	13.00	31.62B

Duncan's Multiple Range Test
Means with the same letter are not significantly different from each other in each class at the 0.05 level.

In terms of total yield - there was no significant difference between an early and late harvest two weeks apart, however, with respect to the large size tubers greater than 60 mm in size, the late harvest was significantly better than the early harvest. In the 45-60 mm range, the reverse was true, where the early harvest produced significantly better yields than the late harvest.

The nitrogen rates x harvest interaction showed that the lower rate of N of 135 kg N/ha at both an early and late harvest was significantly better than higher rates of N in terms of total yield. It should be noted that 135 kg N/ha was the rate suggested in the management profile of this cultivar both early and late harvest. These findings merely confirm the original recommendations.

A look at yields in Table 4 showing the size range greater than 45 mm as required for processing, illustrates again that 135 kg N/ha at both an early or late harvest is the best.

TABLE 4: YIELD OF SHEPODY IN THE SIZE RANGE >45 MM REQUIRED FOR PROCESSING AT TWO HARVEST DATES AND THREE LEVELS OF NITROGEN

Nitrogen x Harvest Date Effect	Yield Tonnes/Ha >45 mm	% Total Yield
135 kg N/ha x Early Harvest	33.28	90%
135 kg N/ha x Late Harvest	30.95	89%
168 kg N/ha x Early Harvest	29.30	92%
168 kg N/ha x Late Harvest	28.43	92%
201 kg N/ha x Early Harvest	26.83	88%
201 kg N/ha x Late Harvest	28.18	89%

Specific Gravity (S.G.): Specific gravity is very important for potatoes destined for processing. It is well known that high N levels combined with a shortened growing season through an early harvest, tend to produce immature tubers of low S.G. High S.G. is mandatory in the processing industry as high S.G. tubers produce a higher yield of French Fries and chips than low S.G. tubers, and also utilize less oil in the manufacturing process (Lulai 1986)

The S.G. offers various treatments are given in Table 5 below:

TABLE 5: SPECIFIC GRAVITY AS AFFECTED BY RATE OF N FERTILIZATION AND DATE OF HARVEST

Treatment	S.G. of Tubers
135 kg N/ha x early harvest	1.070
135 kg N/ha x late harvest	1.068
168 kg N/ha x early harvest	1.065
168 kg N/ha x late harvest	1.063
201 kg N/ha x early harvest	1.061
201 kg N/ha x late harvest	1.063

The trend here is that the lower N rates produced tubers with the higher S.G. and the early harvest, with the exception of the highest rate of N, produced tubers with the higher S.G. The best S.G. of tubers was produced by the lowest N rate of 135 kg N/ha at the early harvest.

Sucrose Content and French Fry Colour:

Many aspects of potato production are known to affect processing colour out of the field. Walsh (1986) listed date of planting, weather, amount of nitrogen affecting maturity, topkilling and handling during harvest. Except for N all the other factors here were constant to all the treatments.

Good colour in French fries and chips is difficult to achieve and is related to the amount of sucrose in the tubers. Since sucrose can be broken down into glucose and fucose (both reducing sugars) high sucrose certainly contributes to loss of colour. Similarly, low sucrose content is related to good colour in French fries and chips.

The role of nitrogen in loss of colour is an indirect one. Overfertilization with N favors top growth over tuber development and so delays tuber maturity. Maturity affects the conversion of sugars to starch, with immature tubers having a greater proportion of sugars to starch and thus likely to produce poor colour in the processed product. Table 6 shows the French fry colour of tubers from the different treatments in both Agtron units and their equivalent U.S.D.A. colour rating on a scale of 1 to 7, where 1 is good colour and 7 is very poor. The U.S.D.A. scale is the one utilized by the processor and up to 4 is acceptable. Sucrose content is given in mg/g. Table 6 shows the relevant data.

TABLE 6: FRENCH FRY COLOUR AND SUCROSE CONTENT AS AFFECTED BY RATE OF N FERTILIZATION AND DATE OF HARVEST PRIOR TO STORAGE.

Treatment	French Fry Colour Mean Agtron Unit	Mean USDA Equivalent	Sucrose Mean Content mg/g
135 kg N/ha x early harvest	82	1.8	1.76
135 kg N/ha x late harvest	66	2.8	1.90
168 kg N/ha x early harvest	75	1.9	1.34
168 kg N/ha x late harvest	76	2.3	1.58
201 kg N/ha x early harvest	84	1.7	1.36
201 kg N/ha x late harvest	79	2.1	1.38

Note: U.S.D.A. colour of 1 -4 is acceptable to Processor. Higher numbers correspond to a worsening of colour.

Given that the relationship between sugars and starch is complicated and scientists are still figuring out the different pathways followed in the conversion of sugars to starch and back to sugars again, it is apparent that the early harvest at each N level has a lower sucrose content than the later harvest. Also the early harvest at each N level has a better colour than the later harvest using the U.S.D.A. colour scale.

CONCLUSION: The work carried out on fertilizer rates of N and harvest dates with the cultivar Shepody suggests that lower rates of N (135 kg N/ha) at both an early or late harvest date produce higher yields of tubers for processing with better specific gravity than higher fertilizer rates of N (168 - 201 kg N/ha). These findings substantiate the recommendations for the cultivar given in the Management Profile of 1984 and clearly indicate that growers who have been fertilizing at rates in excess of 168 kg N/ha have been overfertilizing.

Earlier harvest dates also tend to produce tubers of better processing colour than later harvest dates.

ACKNOWLEDGEMENT: The writer respectfully acknowledges the efforts of G.P. Coté during the period the work was undertaken and to D. McIssac for carrying out the sucrose, colour and specific gravity analysis on tuber samples.

REFERENCES: 1. Lulai, E.C., 1986. Potato Specific Gravity, Chipper/Snacker, Aug; 28-29.

2. Shepody, Arrangement Profile, 1984. Potato Breeding, F'ton Res. Stat. Agric. Canada.

3. Walsh, J.L., 1986. Ten Tips for Better French Fry Colour. Factsheet, Potato Centre, N.B.D.A.

4. Walsh, J.L. 1986. Chip and French Fry Color Affected by Handling. Factsheet, Potato Centre, N.B.D.A.

5. Walsh, J.L., 1988. Effect of Topkill Date on Yields and Chip color of Five Chipping Potato Varieties Stored At Three Temperatures. Potato Centre, N.B.D.A

ENQUETE DES PRATIQUES AGRONOMIQUES POUR LA PRODUCTION DE SHEPODY

Ghislain J. Pelletier

Résumé: Une enquête sur la production de la variété Shepody a été effectuée dans la région de Grand-Sault en 1988. Les objectifs de cette activité étaient (1) enquêter sur les pratiques agronomiques de la variété Shepody et (2) identifier les meilleures pratiques agronomiques.

Cette enquête a permis de dégager d'importantes lacunes dans la régie agronomique de Shepody au niveau de la rotation des cultures, la fertilisation azotée et le placement des semences.

L'étude des coefficients de corrélation à mis en relief le rôle de la nutrition minérale dans l'obtention de récoltes de qualité, de même qu'une plantation hâtive et d'un bon programme de rotation.

SHEPODY AGRONOMIC PRACTICES SURVEY

Abstract: In 1988, a survey on the agronomics practices used to produce Shepody was conducted in the Grand Falls area. The objectives of the study were to (1) survey the agronomic practices followed by potato producers and (2) determine by the use of the correlation analysis, the most important agronomic practices that would give the best quality yield.

The lack of a sound crop rotation program, an inappropriate nitrogen fertilizer program and a failure to reached a desired plant population are the highlights of the survey.

The correlation analysis has put into perspective the role of mineral nutrition program in obtaining high quality yields.

INTRODUCTION: La variété de pommes de terre Shepody, disponible que depuis 1980, représentait déjà en 1988, 65% des besoins contractuels de l'usine McCain Foods Ltée.

Bien qu'un profil cultural pour la production de Shepody ait été développé par le Dr. Kenneth Rykbost, les producteurs ne réalisent pas toutes les recommandations qui y sont inscrit.

Les objectifs de ce présent travail sont de :

1) Enquêter sur les pratiques agronomiques utilisées par nos producteurs.

2) Identifier les meilleures pratiques agronomiques à l'aide d'analyse de corrélation.

MATERIEL ET METHODE: En tout, 19 fermes comprenant 20 champs de la région de Grand-Sault ont participé à l'enquête effectuée en 1988.

Les renseignements suivants ont été recueillis:
- programme de rotation des cultures
- données relatives à la plantation
- programme de pulvérisation
- évaluation de la levée
- échantillonnage de feuilles (2) et de sols
- détermination de la quantité et la qualité des récoltes (6 échantillons linéaires d'environ 3 m par champs)
- évaluation du poids spécifique à l'aide de l'hydromètre calibré à 1.070

RESULTATS: A) Enquête - Les résultats de l'enquête sont présentés aux tableaux 1 à 8.

TABLEAU 1 ANALYSE DU SOL

	pH	M.O. %	P_2O_5	K_2O	Ca (Kg/ha)	Mg
Moyenne	5.6	3.0	514+	300	1458	195
Maximum	6.4	4.7	514+	413	3287	357
Minimum	5.0	2.0	514+	168	922	98

TABLEAU 2 GESTION DU SOL ET FERTILISATION

	Pommes de terre dans rotation %	Fertilisation N	P_2O_5	K_2O (Kg/ha)
Moyenne	61	138	111	141
Maximum	80	169	169	189
Minimum	50	79	47	69

Labour: 35% chisel/ 65% charrue
Source d'azote: 75% NA / 20% Urée/ 5% SA
Fractionnement d'azote: 15% des champs
Fertilisation avec Mg: 35% des champs
Fertilisation avec Ca: 10% des champs
Fertilisation avec soufre: 75% des champs
Fertilisation avec micro-éléments: 80% des champs

TABLEAU 3: SEMENCE ET PLANTATION

	Espacement désiré(cm)	Espacement réalisé(cm)	Date de plantation	Levée (%)
Moyenne	27	37	11 mai	83.8
Maximum	33	43	21 mai	100
Minimum	19	27	3 mai	73

Classe de semence: 10% Elite 3/ 65% Fondation/ 25% Certifiée
Tranchage: 65% à la machine/ 35% à la main
Traitement: 75% fongicide/ 25% chaux

TABLEAU 4: REPRESSION DES NUISIBLES

Mauvaises herbes	Mildou	Insectes
55% dinoseb	8.6 pulvérisation	4 applications
25% metribuzin	44% fongicide systémique	55% pour pucerons
15% metrobromuron		
5% linuron		

TABLEAU 5: INHIBITEURS DE GERMINATION ET DEFANAGE

Inhibiteurs de germination: 55% des champs ont été traités avec l'hydrazine maléique.

Défanage: 2 applications de défanant
42% diquat/ 58% dinoseb
40% des champs ont été roulés

TABLEAU 6: ANALYSE FOLIAIRES

	1 ière série %					PPM	
	N	P	K	Ca	Mg	B	ZN
Moyenne	6.3	0.4	2.4	0.3	0.4	49.1	20.0
Maximum	7.1	0.6	3.4	1.3	0.5	254	240
Minimum	5.5	0.2	1.1	0.6	0.3	17	53.6
	2 ième série						
Moyenne	4.7	0.3	1.5	0.7	0.7	30.8	53.2
Maximum	5.4	0.4	3.4	2.1	1.0	67	136
Minimun	3.8	0.2	1.6	0.9	0.5	17	24

TABLEAU 7: QUANTITÉ ET QUALITÉ DES RÉCOLTES

	Rendements (Kg/ha)		%					
	Total	Vendable	Petite	10 onces	Gale	Difforme	Coeur Creux	Poids Spécifique
Moyenne	31032	24165	10.4	25.9	9.1	5.1	4.0	1.0815
Maximum	36765	31339	18.7	37.6	64.5	20	9.3	1.0900
Minimum	22187	18581	5.2	16.1	0	0	0	1.0753

B) Analyses de corrélations - L'étude des coefficients de corrélation influençant le poids spécifique, le rendement total et le rendement vendable est présenté au Tableau 8.

TABLEAU 8: COEFFICIENT DE CORRÉLATIONS (r) ET NIVEAU DE PROBABILITÉ (p) RESPECTIFS DES PRINCIPAUX FACTEURS ETUDIÉS POUR LE POIDS SPÉCIFIQUE, LES RENDEMENTS TOTAL ET VENDABLE

Poids spécifique

Facteur	r	p
K_2O contenu dans le sol	-0.67	.001
Mg pétiole	+0.49	.04
K pétiole	-0.46	.05
Ca pétiole	+0.45	.06
Mg sol	-0.43	.07
Fertlisation P_2O_5	-0.41	.08
Date de plantation	-0.38	.10
Rendement total		
P pétiole	+0.52	.05
Rendement vendable		
P pétiole	+0.51	.05
Fréquence pomme de terre dans rotation	-0.45	0.10

CONCLUSIONS: Cette enquête a permis de dégager d'importantes lacunes au niveau de la régie agronomique de la variété Shepody pratiquée par les producteurs de pommes de terre de la région de Grand-Sault.

Au nombre des plus importantes, mentionnons le manque de rotation, une fertilisation azotée inappropriée, tantôt déficiente, tantôt excessive et le placement inadéquat des semences. Cette enquête a aussi revélé d'importante variation quant au rendement (certains champs donnent jusqu'à 66% plus de rendement que les autres), et à la qualité des récoltes.

L'étude des coefficients de corrélation met en relief le rôle de la nutrition minérale au niveau du poids spécifique et des rendements total et vendable. Ainsi, la corrélation la plus significative est sans aucun doute la relation inverse qui existe entre le taux de K_2O contenu du sol et le poids spécifique. En ce qui a trait aux rendements total et vendable, cette analyse démontre une relation positive en le niveau de phosphore dans la pétiole de la pomme de terre et les rendements. Enfin, cette exercice nous a souligné l'importance d'une plantation hâtive pour le poids spécifique et d'un bon programme de rotation pour l'amélioration de la qualité.

Il est important de ne pas conclure que tous les autres facteurs étudiés n'ont pas de rôle à jouer. Etant donné la multitude des variables étudiées et aussi celles qui nous a pas été possible d'étudier, certaines importantes relations peuvent avoir été masquées par le facteur dilution.

EVALUATION DE LA VARIETE RUSSET NORKOTAH POUR LA PRODUCTION DE POMMES DE TERRE LAVEES ET EMBALLEES DANS DES BOITES DE CARTON

Ghislain J. Pelletier

Résumé: Une étude a été entreprise pour déterminer la régie de la variété Russet Norkotah dans le but de produire des pommes de terre de table lavées et emballées dans des boîtes de carton. On a également comparé la performance de celle-ci à la variété Russet Burbank.

Trois taux de fertilisation (900, 1120 et 1350 Kg/ha de 15-15-15) et trois espacements sur le rang (25.4, 33, 40.6 cm) pour chacune des variétés ont été utilisés.

Les différents taux de fertilisation n'ont pas significativement influencé les composantes de rendement de Russet Norkotah. L'utilisation de différents espacements sur le rang a donné des différences significatives pour les catégories de rendement <50 mm, 50 mm à 227 g et total. Les différences n'ont pas été significatives pour les catégories > 227 g vendable et défaut.

Russet Norkotah a donné des augmentations significatives des catégories de rendement > 227 g et vendable, alors que les catégories de rendement < 50 mm, 50 mm à 227 g, défaut et total ont été significativement plus élevées pour la variété Russet Burbank. Les rendements de la catégorie > 227 g (pour emballage dans des boîtes de carton) sont 32 % plus élevés pour la variété Russet Norkotah comparativement à la variété Russet Burbank.

Une fertilisation de 135 Kg/ha d'azote et l'utilisation d'un espacement de 33 cm sont recommandées pour la production de Russet Norkotah destinée à l'emballage dans des boîtes de carton.

RUSSET NORKOTAH MANAGEMENT AND EVALUATION TRIAL FOR TABLESTOCK COUNT TRADE PRODUCTION

In order to assess the potential (yield wise) and to develop a production management profile for Russet Norkotah under New Brunswick conditions, a Management and Evaluation trial was established in Grand Falls, N. B. in the spring of 1988.

Three fertilizer rates (900, 1120 and 1350 Kg/ha of 15-15-15) and three in-row spacings (25.4, 33, 40.6 cm) were used. Russet Burbank was used as a control with the same treatments.

Russet Norkotah total yield and yield components did not increase beyond the 135 Kg/ha of NPK. Total yield was significantly higher at 25.4, and 33 cm spacing. Count yield (> 227 g), although not significantly higher, were maximized at 33 cm in-row spacing. Both

< 50 mm and 50 mm to 227 g grades were significantly higher at 25.4 cm. Yield of count grade was 32% higher for Russet Norkotah than for Russet Burbank.

This one year trial has demonstrated the count yield potential of Russet Norkotah and also the considerably lower yield of grade defect compared to Russet Burbank.

Suggested fertilizer rate for Russet Norkotah is the equivalent of 135 Kg/ha of nitrogen and the use of 33 cm in-row spacing for the production of tablestock count potatoes.

INTRODUCTION: Le volume des pommes de terre écoulé sur le marché de table a considérablement regressé au Nouveau-Brunswick depuis les deux dernières décennies. Alors que les expéditions de cette catégorie de pommes de terre se chiffraient à 245 454 T en 1963-1964, elles n'étaient plus que 90 909 T en 1985-1986.

Non seulement ce secteur a diminué en terme de volume expédié, mais il a aussi connu une évolution au niveau de la présentation du produit. De plus en plus, les consommateurs (individus et institutions) recherchent des pommes de terre lavées, et il existe un bon potentiel à ce chapitre. Une enquête récente effectuée par la Direction de la mise en marché du ministère de l'Agriculture du Nouveau-Brunswick révèle que l'industrie possède l'infra-structure nécessaire pour augmenter nos expéditions.

L'augmentation de ces expéditions va nécessiter l'obtention d'une variété de pommes de terre plus adaptée à ce type de marché. De nos jours, la principale variété utilisée est la Russet Burbank. Cette variété demande une longue saison de croissance pour atteindre sa pleine maturité, que nous n'avons pas tout le temps. Aussi, nombreux sont les producteurs qui voient de 40 % à 50 % de leurs pommes de terre Russet Burbank enlevées lors du classage. Ces pertes sont imputables aux petites pommes de terre, aux pommes de terre difformes, aux blessures et à l'occasion au verdissement.

La variété Russet Norkotah sélectionnée à l'Université de North Dakotah et connue sous le sigle ND534-4 produit des tubercules de belles apparences. Aussi, dans des études effectuées au Maine, cette variété a produit très peu de rejets. Il est a noter que cette variété n'a pas encore reçu d'homologation permanente au Canada.

Puisque certains expéditeurs ont démontré de l'intérêt pour cette variété, il devient important de comparer cette variété à la Russet Burbank et d'évaluer certaines pratiques pour bien la régir. C'est ce que cette présente étude veut accomplir.

MATERIEL ET METHODE: Pour l'évaluation de la variété Russet Norkotah, nous avons utilisé un dispositif expérimental de split-split-plot. Cet essai a été établi à la ferme de M. Maurice Michaud à Saint-André (N.-B.).

Le traitement principal a été constitué de trois taux de fertilisant de 900, 1120 et 1350 Kg/ha de 15-15-15. Pour chaque taux de fertilisation, nous avons ensemencé les deux variétés Russet Norkotah et Russet Burbank avec les trois espacements de 25.4, 33 et 40.6 cm.

Les parcelles de chaque espacement pour une même variété et un même taux de fertilisation comprenaient trois rangs de 11.6 m. Puisqu'un rang de chaque variété servait de bordure, deux rangs de 11.6 m ont été récoltés pour fin d'évaluation.

Le champ utilisé pour l'évaluation était à sa quatrième année de pommes de terre.

Les rangs ont été ouverts avec une planteuse en même temps que les trois taux de fertilisation ont été appliqués. La semence a été coupée en morceaux d'environ de 50 g et traitée avec Easout. Le tout a été planté à la main le 11 mai 1988. La culture a été défanée le 22 septembre et la récolte effectuée le 12 octobre. Chacun des échantillons récoltés, composé de deux rangs de 11.6 m pieds, a été classé pour en déterminer la composition du rendement et la qualité. Un calibreur à chaîne a été utilisé pour séparer les petites pommes de terre (< 50 mm), alors qu'un calibreur à rouleau à doigts a été utilisé pour séparer les pommes de terre de catégorie emballage en boîte de carton (plus de 227 g).

RESULTATS: Les résultats des principaux traitements sont présentés au tableau 1.

RUSSET NORKOTAH: L'analyse statistique des données pour la variété Russet Norkotah ne révèle pas de différence significative entre les taux de fertilisation et les éléments composant le rendement de cette variété. Il ne semble donc pas avoir d'avantage à utiliser plus de 900 Kg l'hectare de 15-15-15 pour la production de Russet Norkotah.

L'utilisation de différents espacements sur les rangs a toutefois donné des différences significatives pour les catégories de rendement < 50 mm, 50 mm à 227 g et total alors que les différences ne sont pas significatives pour les catégories de rendement vendable, défaut et > 227 g.

Bien que les catégories de rendement, total et 50 mm à 227 g soient plus élevées à 25.4 cm d'espacement, la production de la catégorie de rendement > 227 g n'y est pas avantagée. Pour cette catégorie, l'utilisation d'un espacement de 33 cm devient la plus intéressante.

RUSSET BURBANK: L'analyse statistique des données de la variété Russet Burbank ne révèle pas de différence significative entre les taux de fertilisation et les éléments composant le rendement de cette variété. Bien que le type de dispositif expérimental utilisé ne permet pas de dégager ces différences, nous observons néanmoins des tendances au niveau de la catégorie défaut. Ainsi en passant de 900 à 1350 Kg/ha de 15-15-15, la catégorie défaut passe de 4050 à 5992 Kg/ha.

L'utilisation de différents espacements sur le rang a donné des différences significatives pour les catégories de rendement > 227 g, 50 mm à 227 g, < 50 mm et défaut, alors que ces différences ne sont pas significatives pour les catégories de rendement total et vendable. L'utilisation d'un espacement minimum de 33 cm et préférablement 40.6 cm devrait être utilisé pour la variété Russet Burbank lorsque l'objectif est de produire pour le marché spécifique de la catégorie > 227 g.

COMPARAISON ENTRE RUSSET NORKOTAH ET RUSSET BURBANK

L'analyse statistique des données nous révèle que les catégories de rendement > 227 g et vendable sont significativement plus grandes pour la variété Russet Norkotah, alors que les catégories de rendement < 50 mm, 50 mm à 227 g, défaut et total sont significativement plus grandes pour la variété Russet Burbank. Il est aussi intéressant de noter que 14 % du rendement de la variété Russet Burbank est composé de la catégorie défaut qui ne représente que 4 % du rendement de la variété Russet Norkotah.

En ce qui a trait à la proportion vendable, 88 % du rendement de la variété Russet Norkotah l'est, alors que cette proportion pour Russet Burbank n'est que 75 %.

Avec un objectif de production de pommes de terre de la catégorie 227 g la variété Russet Norkotah a donné 32 % plus de pommes de terre dans cette catégorie que la variété Russet Burbank.

De plus, nous avons observé lors de la croissance des variétés dans le champ la présence de verticilliose dans la variété Russet Norkotah (ces observations ont été confirmées en laboratoire). Cette présence a été visualisée au classage lorsque 4.2 % des tubercules sectionnés ont montré une décoloration du talon, symptôme de la présence du verticilliose. Cette observation n'est sûrement pas étrangère au fait que le champ utilisé pour l'essai était à sa quatrième année de pommes de terre.

CONCLUSION: L'évaluation de la variété Russet Norkotah pour la production de pommes de terre de la catégorie lavée, emballée dans des boîtes de carton nous indique que Russet Norkotah a donné 32 % de plus de tubercules de cette catégorie (> 227 g) que la variété Russet Burbank. De plus, alors que la fraction défaut représentait

4 % du rendement total de la variété Russet Norkotah, cette fraction était de 14 % pour la variété Russet Burbank. Une réduction de cette catégorie rend le classage beaucoup plus efficace en réduisant le temps relié à cette opération tout en réduisant le volume de pommes de terre qui constitue des rejets. Ces rejets n'ayant pas de débouché posent un problème pour l'environnement.

En ce qui concerne les recommandations pour produire la variété Russet Norkotah pour le marché de pommes de terre lavées, emballées dans des boîtes de carton, voici ce que cette première année d'essai nous suggère:

1. **Fertilisation:** 900 Kg/ha de 15-15-15, ou l'équivalent de 135 Kg/ha d'azote.

2. **Espacement:** 33 cm

3. **Rotation:** Eviter les champs dont une bonne rotation n'y est pas pratiquée ou ayant donné des récoltes avec des signes de verticilliose.

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TABLEAU 1: RESULTATS DES PRINCIPAUX TRAITEMENTS DE L'ESSAI

TRAITEMENT			REDEMENT (kg/ha)					
VARIETE	FERTILISATION (kg/ha)	ESPACEMENT (cm)	< 50 mm	50mm à 227g	> 227g	DEFAUT	VENDABLE	TOTAL
Russet Norkotah	900		2904	4623	23764	1165	28388	32438
	1120		2441	4161	22951	1443	27112	30995
	1350		2626	4882	24763	1110	29645	33363
PPDS(p=0.05,Duncan)			NS	NS	NS	NS	NS	NS
		25.4	3458	5770	23376	1110	29165	33733
		33	2589	4383	24375	1202	28758	32549
		40.6	1923	3514	23709	1387	27223	30552
PPDS(p=0.05,Duncan)			444	462	NS	NS	NS	1794
Russet Burbank	900		4420	9080	17717	4050	26797	35286
	1120		3532	7545	18216	5419	25762	34713
	1350		3884	8877	18346	5992	27241	37098
PPDS(p=0.05,Duncan)			NS	NS	NS	NS	NS	NS
		25.4	5141	9987	16681	4365	26686	36174
		33	3643	8193	18549	5382	26742	35748
		40.6	3052	7342	19049	5715	26391	35175
PPDS(p=0.05,Duncan)			684	1553	1794	1128	NS	NS
Russet Norkotah			2663	4568	23820	1239	28388	32272
Russet Burbank			3939	8507	18105	5141	26612	35693
PPDS(p=0.05, Duncan)			425	555	1849	721	1387	13315

EVALUATION DES COUVERTURES FLOTTANTES POUR LA PRODUCTION DE POMMES DE TERRE DE PRIMEUR

Ghislain J. Pelletier

Résumé: Deux types de couvertures flottantes ont été évalués pour la production de pommes de terre de primeur au Nouveau-Brunswick: l'Agronet et un polyéthylène multi-troué.

Pour fin d'évaluation, la variété Jemseg pré-germée a été utilisée dans un dispositif expérimental de split-plot. Les cinq traitements principaux étaient: Agronet premier et deuxième retraits, multi-troué premier et deuxième retraits et témoin. Les trois dates de récolte (68, 73 et 80 jours après la plantation) ont consitité les sous traitements.

Les cultures sous le multi-troué ont atteint le niveau 50% émergence 4.5 jours plus tôt que le traitement témoin, alors que les cultures sous Agronet ont atteint ce stade 2 jours avant le traitement témoin.

Les augmentations de rendement de la catégorie Canada No. 1 avec l'utilisation du multi-troué ont varié de 5065 à 8113 Kg/ha selon la date de récolte. Les augmentations dûes à l'utilisation de l'Agronet ont varié de 3283 à 6287 Kg/ha. Les augmentations de rendement ont été plus élevées pour le deuxième retrait des deux types de couvertures flottantes.

Avec un prix moyen de 0.38 $ du Kg au début juillet pour les six dernières années, les augmentations de rendement données par l'Agronet ne suffisent pas à couvrir les coûts reliés à son utilisation. Par contre, le multi-troué s'est montré rentable sous ces conditions.

EVALUATION OF ROW FLOATING COVERS FOR EARLY POTATO PRODUCTION

Abstract: Two types of floating row covers were evaluated for early potato production in New Brunswick: Agronet and a pre-perforated transparent polyethylene.

The cultivar Jemseg was green sprouted and used in a split plot experimental design. The main plots consisted of five treatments:

control, Agronet June 1 and June 10 removals, polyethylene June 1 and June 10 removals. The sub-plots were three different harvest dates: 68, 73 and 80 days post planting.

The crop grown under the polyethylene reached 50% emergence 4.5 days earlier than control, while those under Agronet reached 50% emergence 2 days before control.

Canada No. 1 yield increases from the use of the polyethylene ranged from 5065 to 8113 Kg/ha varying with the harvest date. The increase from the use of Agronet ranged from 3283 to 6287 Kg/ha, also varying with the harvest date. Yield increases were higher at the June 10 removal than the June 1 removal for both floating row covers.

With an average price of $0.38/Kg for early July delivery for the last six years, the yield increases are not sufficient to cover the cost of Agronet but will give a positive return for the polyethylene.

EVALUATION DES COUVERTURES FLOTTANTES POUR LA PRODUCTION DE POMMES DE TERRE DE PRIMEUR AU NOUVEAU-BRUNSWICK

INTRODUCTION: L'utilisation de couvertures flottantes pour la production de pommes de terre de primeur connait un gain de popularité au Nouveau-Brunswick. Cette technique, combinée à la pré-germination des plants, permet d'avancer la date des récoltes et d'obtenir des meilleurs prix pour les pommes de terre. Des essais effectués en 1987 au Nouveau-Brunswick avec une couverture flottante du type Agronet ont permis d'obtenir des accroissements de rendement de 3810 à 6163 Kg/ha selon que les plants aient été pré-germés ou non et la date de récolte. Avec un coût combiné du matériel et de la main-d'oeuvre supplémentaire évalué à 2103 $ par hectare (en supposant 2 années d'utilisation de l'Agronet) l'avantage économique de son utilisation a été de beaucoup réduit. Il devenait nécessaire de trouver un matériel moins cher à l'achat et pouvant être utilisé deux années tout en donnant des résultlats voisins à l'Agronet.

Le but de ce projet est justement de comparer la performance d'un matériel à base de polyéthytlène multi-troué à celle de l'Agronet.

MATERIEL ET METHODE: Le type de matériel utilisé pour comparer avec l'Agronet est un polyéthylène multi-troué de 38 microns et ayant une densité de 200 trous de 1 cm de diamètre par mètre carré. Ce matériel est disponsible dans un format de 6,1 m x 152 m. Un hectare de ce matériel coutait au printemps 1987 3034 $ comparativement à 4945 $ pour l'Agronet (format 6,4 m x 100 m).

Les essais de comparaison des performances des deux types de couvertures flottantes ont été effectués sur la variété Jemseg dont

les plants ont préalablement été pré-germés. Un dispositif de split plot avec quatre répétitions a été utilisé dans cette évaluation. Chaque parcelle comprenait cinq rangs de 10.7 m longueur. Les trois rangs du centre ont été récoltés à trois dates différentes: 68, 73 et 80 jours après la plantation. Cinq traitements principaux ont été inclus dans l'expérience: témoin, Agronet premier retrait, multi-troué premier retrait, Agronet deuxième retrait et multi-troué deuxième retrait.

La plantation a été effectuée le 29 avril et 900 Kg/ha 15-15-15 ont été placées en bande à la plantation. Les plants ont été tranchés à la plantation et espacés à 20,5 cm sur le rang. Le Patoran (400 g/1) à raison de 5 1/ha a été utilisé pour la répression des mauvaises herbes. Les couvertures flottantes ont été posées les 2 et 3 mai. Le premier retrait a été effectué le 1 juin et le deuxième, le 10 juin. Le buttage a été effectué le 13 juin. Des observations ont été effectuées aux différents stades de la culture. Les rendements ont été prélevés à 68, 73 et 80 jours de la plantation, soient les 6, 11 et 18 juillet 1988. Aucune pulvérisation d'insecticide et de fongicide n'a été effectuée en raison de l'absence d'insectes et de mildiou.

RESULTATS:

Emergence des plants

La figure 1 montre les influences des couvertures flottantes sur l'émergence des plants de pommes de terre. Au stade 50% émergence, le multi-troué donne des gains de 4,5 jours, alors que ce gain est de 2 jours pour l'Agronet. On y observe aussi que l'émergence sous le multi-troué est beaucoup plus étalée ce qui s'explique par le phénomène de battance du multi-troué sur les plants.

Hauteur des plants au dernier retrait des couvertures flottantes

Le dernier retrait des couvertures flottantes a été effectué le 10 juin. La hauteur des plantes telle que mesurée est indiquée au tableau 1.

Les plantes sous le multi-troué jusqu'au deuxième retrait présentent un développement foliaire plus de deux fois de celui du témoin. Encore une fois, le développement foliaire sous le multi-troué est plus important que sous l'Agronet, et ce pour les deux dates de retrait. On observe encore plus de variations dans la hauteur des plantes sous le multi-troué que sous l'Agronet.

Rendements

Les augmentations du rendement vendable pour les trois dates de récolte sont présentées au tableau 2.

Les parcelles recouvertes de couvertures flottantes pour les deux dates de retrait ont toutes produit des rendements vendables supérieurs aux parcelles témoins, et ce pour les trois dates de récolte. Ces augmentations sont significatives pour les récoltes de 68 jours et 80 jours. En ce qui a trait à la récolte de 73 jours, bien que les tendances soient présentes, la différence n'est pas significative. Ceci peut s'expliquer par une importante variation entre les répétitions des parcelles sous le multi-troué, conséquence des dommages causés par le phénomène de battance. On observe également une plus grande proportion de pommes de terre fissurées sous le multi-troué et ce pour les trois dates de récolte qui peut s'expliquer par une croissance plus rapide sous le multi-troué.

Pour les deux types de couvertures flottantes, les deuxièmes retraits ont donné des rendements supérieurs au premier retrait. Il faut noter que les températures ont été particulièrement basses entre le premier et le deuxième retraits avec des minimums de 1,3 et 1,6°C.

Approche économique

En supposant une durée d'utilisation de deux années pour les deux types de couvertures flottantes et un coût de 210 $/ha supplémentaire à l'installation et au retrait des couvertures flottantes, nous arrivons à un coût de 2683 $ pour l'Agronet et de 1727 $ pour le multi-troué. Pour un prix moyen de 0.38 $/Kg au début juillet pour les six dernières années, l'Agronet devient avantageux économiquement lorsque les augmentations de rendement se chiffrent à 7061 Kg à l'hectare. Pour le multi-troué, il faut obtenir 4545 Kg à l'hectare de plus. Or, l'Agronet ne nous a pas permis d'atteindre de telles augmentations, alors que le multi-troué deuxième retrait a permis de dépasser ce seuil pour les trois récoltes.

CONCLUSION: L'utilisation de couverture flottante permet d'accroître significativement les rendements à la récolte. Ces augmentations, compte tenu d'un prix moyen de 0.38 $/Kg pour les six dernières années, sont suffisantes pour payer les coûts reliés à l'utilisation du multi-troué, mais pas assez dans le cas de l'Agronet. Toutefois le multi-troué utilisé a donné des résultats très variables. Lorsque le site est exposé au vent, les plantes peuvent être endommagées. Il reste donc à essayer un multi-troué à plus haute densité de trous et l'évaluer sur quelques variétés hâtives.

En résumé, nous pouvons conclure que:

a) Les couvertures flottantes contribuent à augmenter les rendements de pommes de terre de façon significative.

b) Dans le cas de l'Agronet, ces augmentations ne sont pas suffisantes lorsque le prix de vente est de 0.38 $ du Kg; elles le deviendraient pour un prix de vente de 0.53 $ du Kg et plus.

c) Le multi-troué avec 200 trous par mètre carré sur des sites exposés au vent endommage les plantes; il devient alors nécessaire d'évaluer un multi-troué à plus haute densité de perforation.

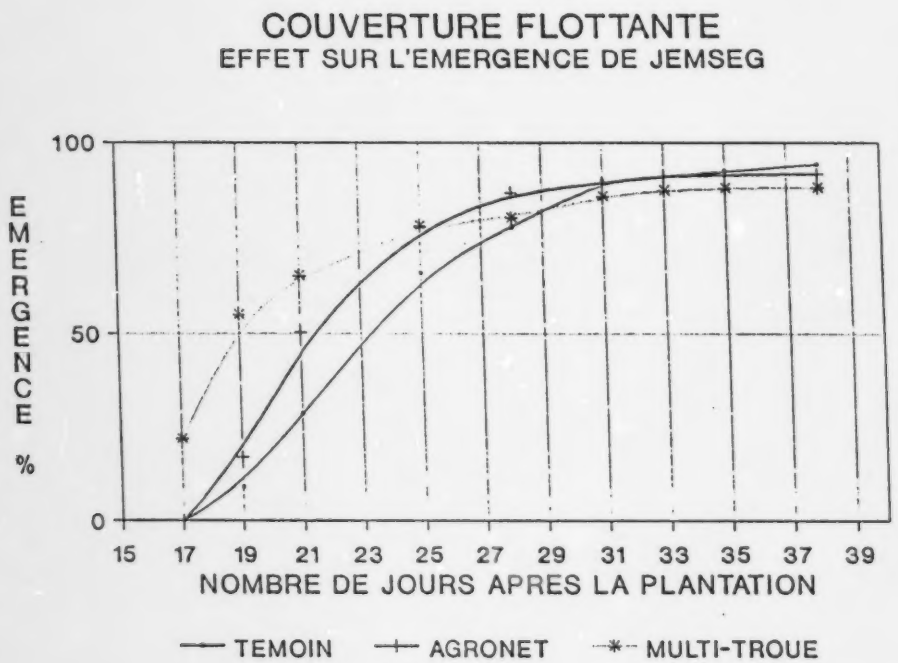

FIGURE 1

TABLEAU 1 - HAUTEUR DES PLANTS AU DERNIER RETRAIT

TRAITEMENT	HAUTEUR(cm)
TEMOIN	9.9
AGRONET-1*	16.0
MULTI-TROUE-1	17.3
AGRONET-2	17.3
MULTI-TROUE	24.3

* AGRONET-1: Agronet premier retrait (1 juin)

MULTI-TROUE-1: Multi-troué premier retrait (1 juin)

AGRONET-2: Agronet deuxième retrait (10 juin)

MULTI-TROUE-2: Multi-troué deuxième retrait (10 juin)

TABLEAU 2 - EFFETS DES COUVERTURES FLOTTANTES SUR L'AUGMENTATION DES RENDEMENTS VENDABLES AUX TROIS DATES DE RECOLTE

TRAITEMENT	AUGMENTATION DES RENDEMENTS VENDABLES (kg/hectare) SELON LA DATE DE RECOLTE			
	68 JOURS	73 JOURS	80 JOURS	3 RECOLTES CONFONDUES
TEMOIN	0 B **	0	0 B	0 B
AGRONET-1	4069 A	2477	5055 A	4113 A
MULTI-TROUE-1	3463 A	2443	4696 A	3542 AB
AGRONET-2	5559 A	3284	6288 A	5044 A
MULTI-TROUE-2	8115 A	5481	5055 A	6232 A
PPDS (P=0.05, Duncan)	2825	NS	4416	3632

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* AGRONET-1: Agronet premier retrait (1 juin)

  MULTI-TROUE-1: Multi-troué premier retrait (1 juin)

  AGRONET-2: Agronet deuxième retrait (10 juin)

  MULTI-TROUE-2: Multi-troué deuxième retrait (10 juin)

** La différence entre les moyennes d'une même colonne dont les lettres diffèrent est significative à P = 0.05

ETUDE DE L'EFFET DE L'ESPACEMENT ET DE LA NON-UNIFORMITE DU PLACEMENT DE LA SEMENCE SHEPODY

Ghislain J. Pelletier

Résumé: Des planteuses de pommes de terre au Nouveau-Brunswick donnent des coefficents de variation(CV) variant de 30 à 87%. Bien que beaucoup d'efforts aient été consacrés pour déterminer l'espacement idéal des plants de Shepody destinés à la transformation, peu ou pas d'attention a été donnée à la qualité du placement des semences.

Cet essai a été entrepris afin de quantifié l'effet de la variation dans le placement des plants sur la récolte de Shepody en utilisant les trois espacements de 25.4, 30.5 et 35.6 cm avec 4 CV de 0, 25, 50 et 75%.

Lorsque le CV passe de 0% à 75%, on a observé une réduction significative du rendement vendable de 14%. Cette réduction de rendement est d'environ 7% lorsque le CV passe de 25% / 50% à 75%.

THE EFFET OF SEED SPACING AND IRREGULAR IN-ROW SPACING ON SHEPODY YIELD

Abstract: Commercial potato planters used in New Brunswick will give coefficient of variation (COV) ranging from 30 to 87%.

A lot of work has been devoted to determine the best seed spacing for Shepody grown for processing. However, little work has been done on the effect of the irregularity of seed spacing on Shepody.

In order to assess the effect of irregular spacing on Shepody yields, a split-plot trial was established with the main factor being the three spacings (25.4, 30.5 and 35.6 cm) and the split being four levels of (COV) 0%, 25%, 50% and 75%.

The increase of COV level from 0% to 75% resulted in a significant reduction of the marketable yield by 14%. Marketable yield reduction of 7% was associated with an increase of COV level from 25% / 50% to 75%.

INTRODUCTION: Des enquêtes effectuées sur la levée des plants dans les champs de pommes de terre ont revélé des variations importantes dans le placement des semences. Non seulement la quantité de plantes par unité de surface est t'elle inférieure à celle désirée, mais les plantes sont placées sur le rang à des intervalles irréguliers.

Plusieurs années d'études sur l'espacement des plants de Shepody ont été réalisées, et dans le dernier profil cultural publié par le Dr. Ken Rykbost en 1987, la recommandation pour l'espacement des plants de Shepody destinés à la transformation est de 25.4 à 27.9 cm.

Toutefois, peu ou pas d'attention a été donnée à l'effet de l'uniformité du placement des plants. Les enquêtes effectuées révèlent que pour les planteuses commerciales utilisées au Nouveau-Brunswick le coefficient de variation (mesure relative de l'écart-type sur la moyenne) obtenu varie de 30 à 87% selon la planteuse utilisée, le type et l'uniformité de la semence, de même que la vitesse d'opération.

Cette étude a été entreprise afin de quantifier l'effet de la variation dans le placement des plants sur la récolte de Shepody.

MATERIEL ET METHODE: Un dispositif expérimental de split plot à quatre répétitions a été utilisé. Les trois espacements sur le rang de 25.4, 30.5 et 35.6 cm ont constitué le traitement principal, alors que les quatre CV de 0%, 25%, 50% et 75% ont consitité le sous-traitement. Chaque sous-parcelle comprenait un rang de 10.1 m de longueur. Des semences tranchées de Shepody ont été utilisées dans cette étude.

Le classage des échantillons a été effectué en pesant individuellement les tubercules de chaque sous-parcelle en utilisant une balance Mettler et le système informatisé Stat-Pack.

RESULTATS: Les résultats de l'essai sont présentés au tableau 1.

Les rendements total et vendable sont significativement plus élevés lorsque le CV passe de 75% à 0%. Ainsi, le rendement vendable du niveau de CV de 0% est de 14% supérieur à celui du niveau de CV de 75%. Bien que non significatives, les augmentations de rendement vendable pour le CV de 0% sont de 6,5% et 5,8% supérieures aux niveaux de CV de 25% et 50% respectivement. Des ordres de grandeur semblables s'appliquent au rendement total. Cette réduction des rendements s'explique par une baisse de rendement des tubercules de la catégorie 10 onces et plus qui est aussi reflétée par un poids moyen plus faible des tubercules.

En ce qui a trait à l'incidence du coeur creux, on observe un accroissement de la proportion des tubercules pesant plus que 10 onces avec des coeurs creux pour les niveaux de CV de 25% et 50% comparativement au CV de 0%.

L'utilisation de différents espacements n'a pas donné de différence significative pour les rendements total et vendable. Cependant on remarque un accroissement significatif du nombre de tubercules par plant lorsque l'espacement passe de 25.4 à 35.4 cm.

Aucune interaction entre l'espacement des plants et le niveau de CV n'a été décelée en ce qui concerne les rendements total et vendable.

CONCLUSION: L'irrégularité dans le placement des semences pour les niveaux de CV variant de 0% à 75% est accompagnée d'une réduction du rendement vendable de 14%. Lorsque le niveau de CV passe de 25% / 50% à 75% la réduction du rendement vendable est de 7% pour la variété Shepody.

Cet essai d'une année vient confirmer que les producteurs de pommes de terre auraient intérêt à reviser leurs opérations de tranchage des semences et de plantation afin de s'assurer d'une plantation aussi uniforme que possible.

TABLEAU 1: EFFET DE L'ESPACEMENT ET DE LA VARIATION DANS LE PLACEMENT DES PLANTS SUR LA RECOLTE DE SHEPODY

TRAITEMENT		TUBERCULES	POIDS (g)	TUBERCULES	RENDEMENT (kg/ha)					%
ESPACE (cm)	CV[2]	PLANT	TUBERCULE	SECTION 10 m	PETITES	MOYENNES	GROSSES	TOTAL	VENDABLE	COE CRE
25.4	0	3.9	204	153.0	3403	14666	15757	34453	30958	22.
25.4	25	4.4	187	174.0	4586	16145	15054	36451	31458	26.
25.4	50	4.2	187	171.3	4198	17236	13482	35452	30958	25.(
25.4	75	3.9	190	155.8	3699	17088	11207	32458	28462	20.(
30.5	0	5.4	201	178.2	3699	20842	14425	39447	35452	22.5
30.5	25	4.6	199	150.3	3070	14166	14666	32956	28961	36.(
30.5	50	4.9	201	159.5	3902	16238	15017	35452	31458	45.(
30.5	75	4.8	193	158.0	3754	15905	13038	32956	29460	27.5
35.6	0	5.4	213	151.3	3255	14462	17292	35452	31957	25.(
35.6	25	5.8	201	162.0	3551	17736	13722	35452	31952	22.5
35.6	50	5.6	196	153.8	3366	17384	12687	33954	30459	35.(
35.6	75	5.5	190	155.3	3847	14370	13833	32456	28462	22.5
EFFETS PRINCIPAUX										
Espacement										
25.4		4.1 A[1]	193	163.5	3958	16275	13870	34454	30145	23.5
30.5		4.9 B	199	161.5	3736	16773	14277	35452	31051	32.9
35.6		5.6 C	201	155.6	3514	15960	14388	34454	30348	26.2
CV										
0		4.9	204	160.8	3458	16644	15812	36451	32456	23.3
25		4.9	196	162.1	3902	16016	14462	34953	30478	28.6
50		4.9	196	161.5	3810	16940	13722	34953	30663	35.6
75		4.7	190	156.3	3791	15775	12687	32456	28462	23.3

[1] Les moyennes d'une même colonne, dont les lettres différentes, sont significativement à p = 0.1 (Duncan)

[2] CV = Coefficient de variation

NITROZYME EVALUATION STUDY

JACQUES LAVOIE

ABSTRACT:

Nitrozyme, a seaweed extract and a cytokinin base product, was sprayed on two potato varieties, Atlantic and Kennebec. The application of the product was done at hook stage, at 1" diameter and a combination of these two alternatives. Evaluation was done on tuber set, grade size, yield and chip color out of storage. No statistically difference was obtained. The increase in yield occured mostly in the ingrade and small category. The best result in both varieties was obtained with an application of nitrozyme at tuber initiation and 1" diameter which gave an increase of 6% in yield.

EVALUTION DU PRODUIT NITROZYME

RESUME:

Le nitrozyme, qui est un extrait d'algues et un produit à base de cytokinines, fut arrosé sur deux variétés de pommes de terre; Atlantic et Kennebec. Le produit fut appliqué au moment de l'initiation des tubercules, à 1 pouce de diamètre ainsi qu'une combinaison de ces deux alternatives. Des données furent recueillies sur le nombre de tubercules par plant, la distribution de la taille des tubercules, le rendement et sur la couleur des fritures après entreposage. Aucune différence significative fut observée. L'accroissement du rendement s'est principalement signalée au sein de la catégorie 1 7/8 - 3 1/2 et < 1 7/8. Pour chacune des variétés, le meilleur résultat fut obtenu avec deux applications successives; c'est-à-dire l'une a l'initiation des tubercules et l'autre 1 pouce de diamètre. L'augmentation du rendement fut d'environ 6%.

Introduction:

The performance of a plant during a growing season will depend on weather. Growing conditions, such as, low or high moisture levels, hot and cold temperature variation and soil imbalances contribute to stress and result in under performance crop. Plants under stress are unable to produce sufficient cytokinins, a natural plant growth hormone necessary for germination, cell division, root development, flowering and seed formation. Nitrozyme is a cytokinin-base product, which is supposed to give an increase in

the yield. The object of this experiment is to evaluate the nitrozyme, a seaweed extract, and its effects on tuber set, grade size, yield and chip colour out of storage.

MATERIALS AND METHODS

Two chipping varieties were used in this trial: Kennebec and Atlantic. Certified seed was purchased for planting. Seed was pre-cut and treated with fungicide, Easeout Ciba-Geigy Canada Ltd. on May 12th and 13th. The cut seed was held at 15°C and 95% for 6 to 7 days to allow wound healing.

Planting dates were May 18th and 19th. The experiment design used was a 4 x 4 Latin square with four replication of four treatment. Plots were 15 feet long by 4 rows wide with 3 feet between the rows. Seed beds were prepared with the use of a mechanical planter. Seed pieces were hand-planted at 25 cm spacing into prepared rows. One thousand pounds per acre of 12-15-15 was applied during row preparation.

Care and maintenance of the plots was the responsibility of the cooperating grower. The first application of nitorzyme was done at hook stage on July 12th. The second application was done on July 18th when the tuber had 1" diameter. Several times prior to harvest starting on August 8th, four plants from each plot were pulled and the tubers were brought to the laboratory at Wicklow for sucrose content and chip color.

Topkill date was September 2nd. Harvest was done on September 16th and 17th. The two middle rows were lifted and hand-harvested into 100 pound burlap bags and transported to the Potato Storage Management Center. The potatoes were passed on a grade table and graded into three categories: 1 7/8, 1 7/8 - 3 1/2, > 3 1/2.

NITROZYME DATA

KENNEBEC

	No. of Undersize Tubers	Weight of Undersize Tubers	No. of Ingrade Tubers	Weight of Ingrade Tubers	No. of Oversize Tubers	Weight of Oversize Tubers	No. of Tubers In Total	Total Weight
T^1	48.0	1627.1	123.5	19961.3	4.0	1909.8	175.5	23498.2
T^2	46.8	1543.0	127.5	21489.2	3.8	1805.7	178.0	24839.1
T^3	40.5	1390.0	126.5	20878.0	3.3	1520.5	170.3	23788.5
T^4	43.8	1564.7	122.8	20116.4	3.5	1783.5	170.0	23464.6

Latin square design with LSD at 5%

barrels/acre

T^1 - applied at tuber initiation (hook stage) only — 152

T^2 - applied at tuber initiation and 1" diameter — 160 — 5.9%

T^3 - applied at 1" diameter only — 154

T^4 - control — 151

NITROZYME DATA

ATLANTIC

	No. of Undersize Tubers	Weight of Undersize Tubers	No. of Ingrade Tubers	Weight of Ingrade Tubers	No. of Oversize Tubers	Weight of Oversize Tubers	No. of Tubers In Total	Total Weight
T^1	35.5	1364.4	168.8	24952.7	6.8	2736.3	211.0	29053.3
T^2	40.8	1465.3	181.0	27704.7	4.8	1837.7	226.5	30693.6
T^3	35.8	1394.1	181.5	26486.3	4.5	1858.2	221.8	29735.6
T^4	34.3	1355.9	164.5	25120.7	5.8	2369.8	204.5	28846.3

Latin square design with LSD 5%

Barrels/acre

T^1 - applied at tuber initiation (hook stage) only — 188

T^2 - applied at tuber initiation and 1" diameter — 198 — 6.4%

T^3 - applied at 1" diameter only — 192

T^4 - control — 186

RESULT AND DISCUSSION

This year, at planting and tuberization time, we had a period of dry weather which affected the establishment and growth of the plant. The sequence of those dry days induced stress to the crop, creating an ideal situation to evaluate the performance of the cytokinin base-product, "nitrozyme". Under these conditions, the plants are unable to produce sufficient cytokinin necessary for the germination, cell division, root development and seed formation. The two, most commonly grown in New Brunswick, potato chip varieties: Atlantic and Kennebec, were examined in this trial.

No statistically significant difference was obtained in the yield and the number of tubers in the treatment when compared to the control*. There is a certain trend that you can relate to the application of this product. The percentage of increase in relation to the total yield has been in the percentage of small but mostly in the ingrade category which is important in the tablestock and seed market. The best results in both varieties was obtained with an application of nitrozyme at tuber initiation and 1" diameter. The product cost/acre is about $5-$7, so if you are getting a yield increase of 6% as observed in this experiment, it could result in a realization of an increase in income per acre.

* There was also no effect observed on the chip color.

AERIAL MONITORING OF POTATO APHIDS IN NEW BRUNSWICK IN 1988

ENQUETE SUR LES VOLS DE PUCERONS INFESTANT LES POMMES DE TERRE AU NOUVEAU BRUNSWICK EN 1988

GUY BERNARD

ABSTRACT:

Aphid catches in yellow pan traps were higher than normal in 1988. Green peach aphid populations in particular reached record levels throughout the month of August.

RESUME:

Les captures de pucerons dans les pièges jaunes furent plus élevées que normal en 1988. Les populations de pucerons verts du pêcher en particulier atteignirent des niveaux records pour la durée du mois d'Août.

Aphids, mainly because of their ability to transmit virus diseases, are an important pest of potatoes. The Green Peach Aphid, in particular, is the major vector of PLRV (leafroll) and an efficient vector of PVY (mosaic). Both of these diseases account for a substantial proportion of the seed field rejections each year in New Brunswick. Aphid populations have been monitored extensively in the Province since 1974 and a warning service based on aphid catches in yellow pan traps has been available to potato producers ever since.

In 1988, 110 yellow pan traps were operated in the province mostly in the counties of Carleton, Victoria and Madawaska. Contents of yellow pan traps are collected by growers in seed fields and by scouts in table and processing potato fields. Samples are brought to the Agricultural Resource Centre in Wicklow for identification. As part of the aphid advisory service, weekly reports on aphid flights, based on these trappings, are sent to cooperating farmers, inspectors and others during the growing season. Information is also made available to all growers through the use of a toll-free telephone answering service, daily radio broadcasts and personal letters. Potato growers are advised to apply a topkiller to seed crops as soon as possible after the occurrence of a major green peach aphid flight in their region.

In 1988, the first green peach aphids were caught in Bath and Bristol on July 20th. The first significant catches occurred in Bath, Florenceville, and Wicklow from July 25th to July 28th. By August 1st, green peach aphids had been captured as far north as St. Andre and as far south as Woodstock.

Green peach aphid populations reached record levels during the first week of August and were caught in unprecedented numbers throughout the month. (Table 1, Graph 1). The heaviest inflights in 1988 were centered in the regions of Bath, Bristol, Glassville and Florenceville. Early heavy flights of green peach aphids normally result in increased transmission of PLRV if inoculum levels are high. As expected, leafroll levels in the seed crop increased substantially in 1988 (Graph 2) as a result of the record 1988 infestation and the increase in inoculum due to an early, although short-lived, green peach aphid flight in 1987.

Catches of the buckthorn aphid are never very high in yellow pan traps. Nevertheless, they were much higher than average in 1988 and occurred early in the season (Graph 3). Catches of the common potato aphid (Graph 4) were only slightly higher than average and occurred throughout the season. The greatest numbers were caught during the month of August. Of these two aphids, only the buckthorn aphid is thought to be able to play a significant role in PVY transmission. Catches of other aphid species (Graph 5), some of which could also play a role in PVY transmission, were also higher than average in 1988.

TABLE 1

HISTORICAL DATA

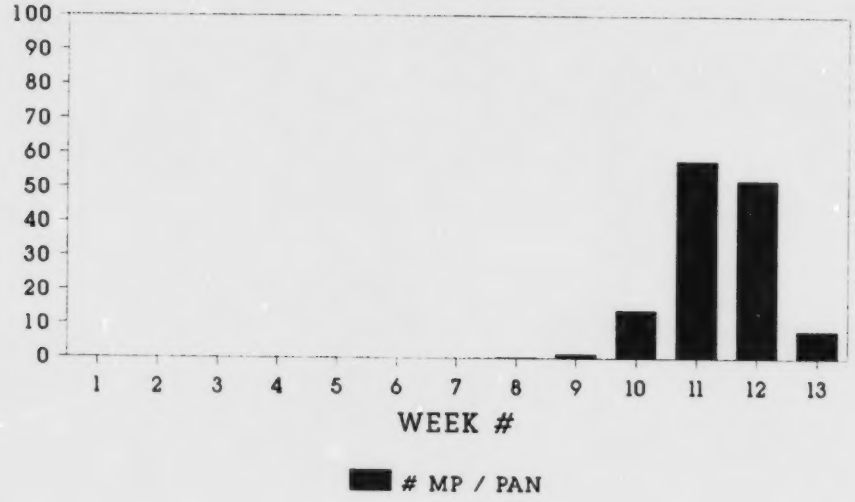
GREEN PEACH APHID FLIGHTS

(average/pan/week)

APPROX. DATE	WEEK #	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
June 01 - 07	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08 - 14	2	0	.01	0	0	0	0	.01	0	0	0	0	0	0	0	0
15 - 21	3	0	.01	0	0	0	0	.01	0	0	0	0	0	.02	0	0
22 - 28	4	0	0	0	0	0	0	0	0	0	0	0	.01	0	.04	0
29 - 05	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 06 - 12	6	0	.01	0	0	0	0	0	0	0	0	0	0	0	.02	0
13 - 19	7	.01	.03	0	0	0	0	.01	.01	0	0	0	0	0	.25	0
20 - 26	8	.01	.23	0	.01	0	.05	.05	.03	0	.02	0	.02	0	.82	.03
27 - 02	9	.04	1.12	.04	.01	.02	.04	.10	.10	0	.01	0	.02	.01	6.40	1.06
Aug. 03 - 09	10	.28	10.29	.04	.07	.19	.13	.43	.29	.01	.01	0	.41	.44	1.30	13.94
10 - 16	11	.74	5.54	.02	.43	.31	.65	1.42	.26	.08	.02	.06	1.31	2.99	.71	57.88
17 - 23	12	2.33	2.79	.01	.16	.27	.55	.62	1.02	.12	.69	.01	.51	8.14	.54	52.20
24 - 31	13	1.99	1.19	.13	.06	.33	.33	.67	.27	.05	.64	.06	1.69	.81	.09	7.91

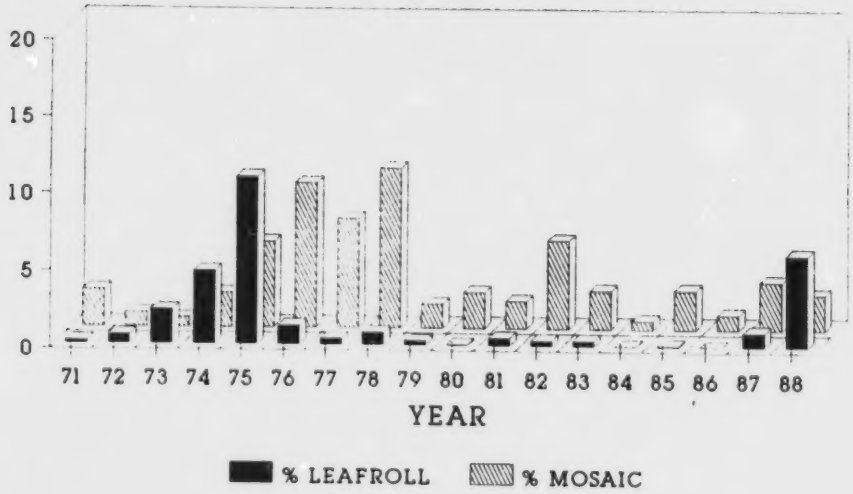
GRAPH #1

GREEN PEACH APHID CATCHES
1988



GRAPH #2

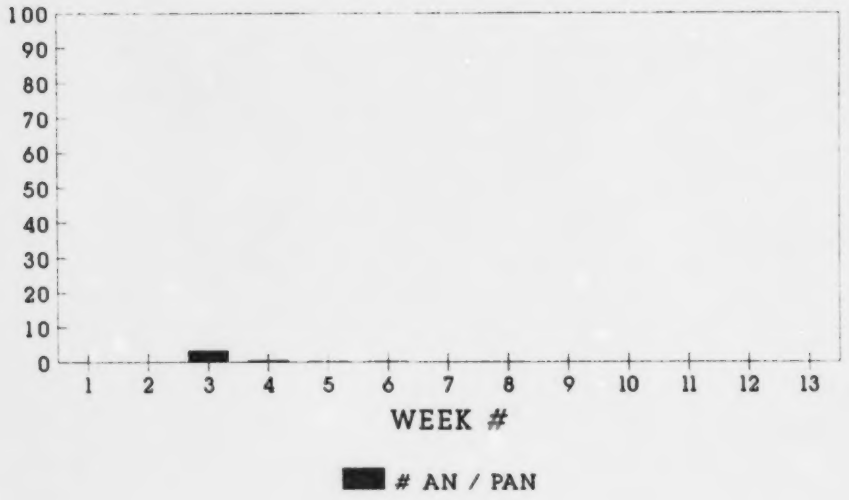
FLORIDA TEST READINDS
1971 - 1988



R.BURBANK

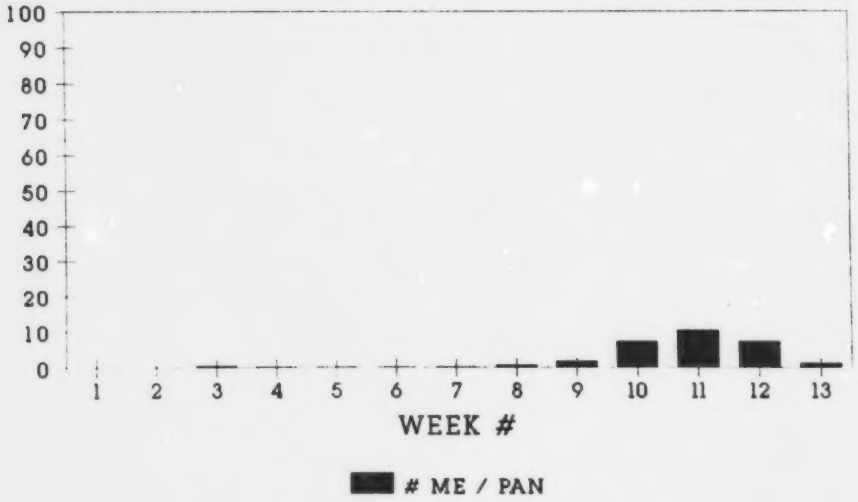
GRAPH #3

BUCKTHORN APHID CATCHES
1988



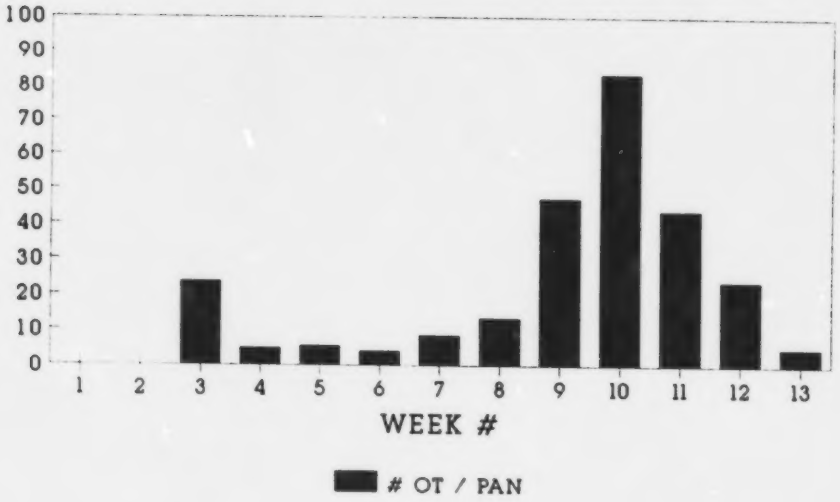
GRAPH #4

COMMON POTATO APHID CATCHES
1988



GRAPH #5

OTHER APHID CATCHES
1988



MONITORING OF INSECT POPULATIONS IN POTATO FIELDS IN 1988

ENQUETE SUR LES INFESTATIONS D'INSECTES DANS LES CHAMPS DE POMMES DE TERRE EN 1988

GUY BERNARD

ABSTRACT:

Insect populations in potato fields were high in 1988. Potato growers experienced increased difficulties in obtaining control of aphids and Colorado potato beetles with chemical insecticides.

RESUME:

Les populations d'insectes furent élevées dans les champs de pommes de terre en 1988. Les producteurs de pommes de terre firent l'expérience de plusieurs difficultés cette année, tant pour le contrôle des puçerons que pour celui du doryphore avec des insecticides chimiques.

The most common insects in potato fields in New Brunswick are the Colorado Potato Beetle, several species of colonizing aphids and the Potato Flea Beetle. Colorado potato beetles are chewing insects. They can cause substantial reductions in yield if defoliation is extensive and occurs during a sensitive growth period.

Aphids are sucking insects. Many are vectors of virus diseases and as such, they are of particular concern to seed growers since tolerances for viruses are low in seed crops. Aphids can also reduce yields if infestations are severe.

Potato flea beetles are small insects which chew holes in the potato leaves. Yield reductions are most likely to occur only if populations are very high late in the season.

In 1988, insect populations were monitored weekly in 35 fields in the potato belt. A sample area was established in each field early in the spring and data was collected from within the plot for a period of 13 weeks.

Aphid populations were estimated by counting the number of winged and wingless aphids of each species on the terminal leaflet of one bottom, one middle and one top leaf per plant on a total of 30 plants per plot. Colorado potato beetle infestations were evaluated by counting the number of larvae as well as adults in each plot on a total of 30 whole plants.

Flea beetle damage was evaluated by counting the number of feeding holes on the terminal leaflet of the fourth leaf from the top of the plant on 14 plants per plot.

The main purpose of this data collection in potato fields has always been to provide growers with timely and easy to understand information that would help them better schedule insecticide applications and avoid unnecessary treatments.

In 1988, as in previous years, an HP85 microcomputer was used to produce reports in the field immediately after monitoring. The reports clearly show the trends in aphid populations and provide growers with a visual evaluation of the success or failure of insecticidal treatments (Graph 1).

Data collected from the 35 field sample is also used to provide information to all growers on field populations of insects. This information is available through the use of a toll-free telephone answering service, daily radio broadcasts and personal letters.

To summarize the 1988 insect monitoring season: The percentage of fields infested by potato flea beetles was high as usual in the spring and diminished rapidly thereafter to show again a modest increase around mid-August. Average damage levels were very low throughout the season.

Populations of aphids in the field were high and many fields in the most severely affected regions were showing generalized symptoms of stress by the third week of August. Similarly, Colorado potato beetle populations were high this year and a large population of second generation larvae created additional control problems for growers during the summer. Both aphids and Colorado potato beetles were hard to contol with chemical insecticides in 1988.

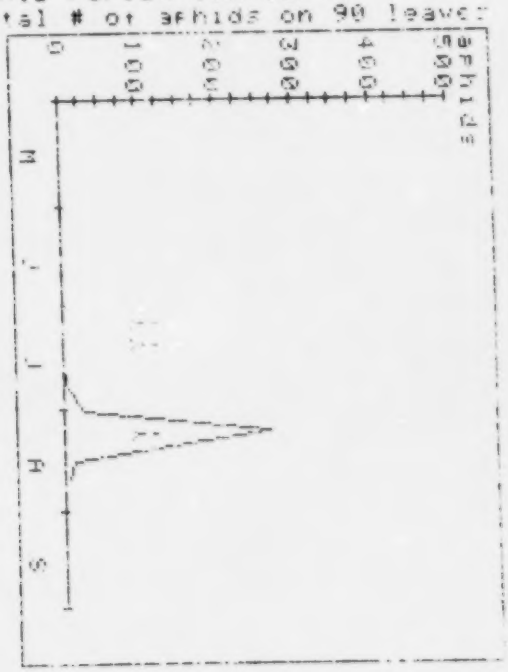
Because of frequent insecticide failures, growers resorted increasingly to combinations of chemicals in an effort to achieve better insect control.

The following graphs (Graph 2 to 12) are based on the data gathered in 35 potato fields during the summer of '88. Although strongly biased by insecticide applications (91 total), they have nevertheless been included for the record and to provide some basis for future comparisons.

GRAPH #1

GROWER# 5
DATE:AUGUST 12
INSECTICIDE APPLICATIONS
7 / 5 SUPRAC @ 5L/A
7 / 13 THIODAN .5L/A
8 / 9 PIRIMOR 2 5KG/A

APHID POPULATION CURVE
total # of aphids on 90 leaves

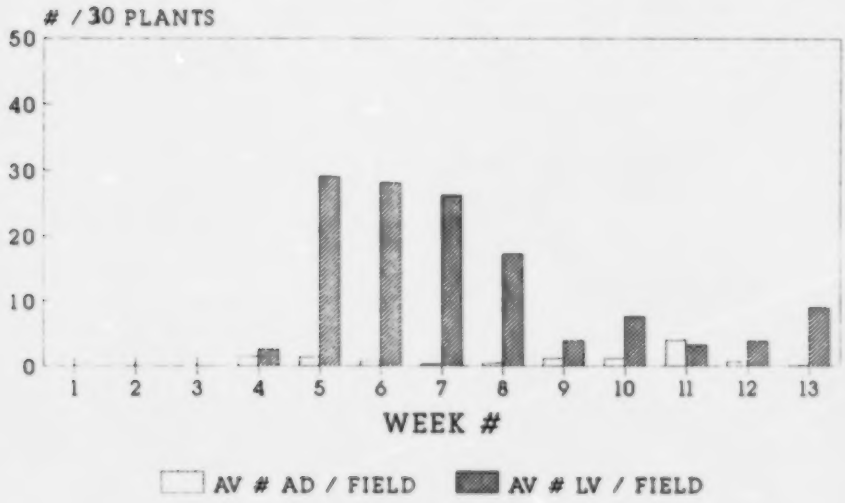


OF THE 9 APHIDS COUNTED
IN YOUR FIELD TODAY
1 WERE GREEN PEACH WINGED
3 WERE GREEN PEACH
0 WERE POTATO WINGED
5 WERE POTATO
0 WERE BUCKTHORN WINGED
0 WERE BUCKTHORN

19.8 % OF THE PLANTS
WERE INFESTED
AVERAGE FLEA BEETLE DAMAGE = 0
HOLES/LEAF
COLORADO BEETLES WERE DETECTED
IN YOUR FIELD
FOR MORE INFORMATION CALL GUY PE

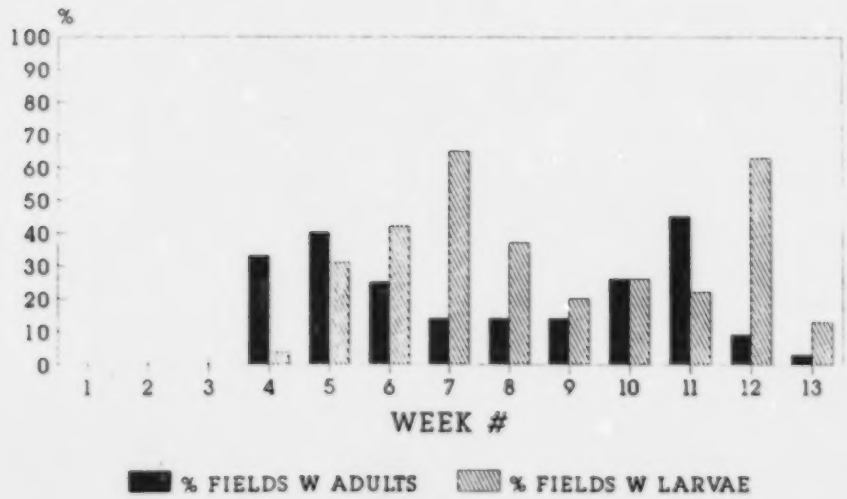
GRAPH #2

FIELD MONITORING 1988
COLORADO BEETLES



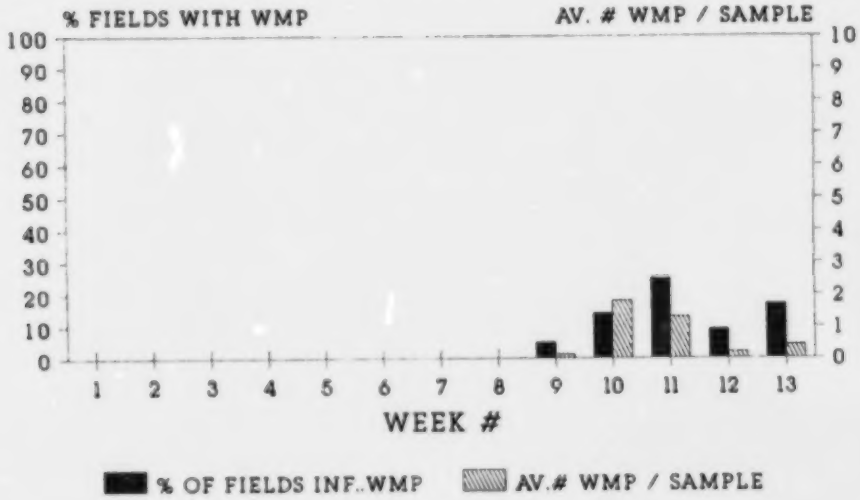
GRAPH #3

FIELD MONITORING 1988
COLORADO BEETLES



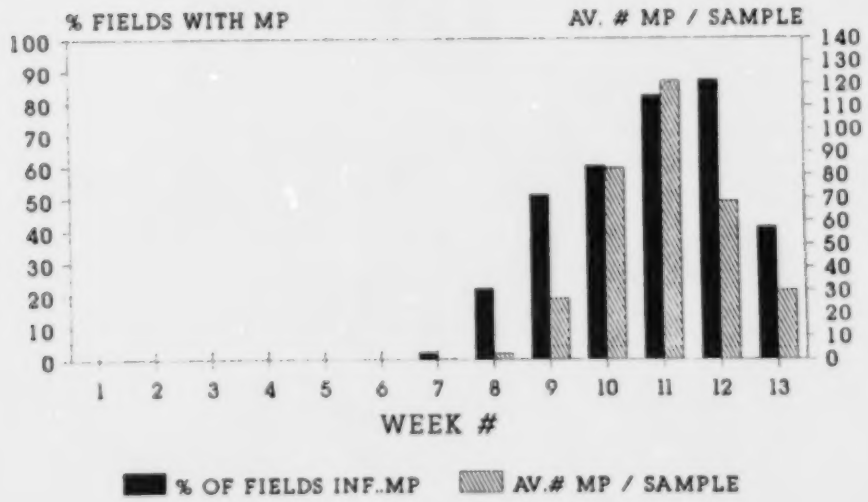
GRAPH #4

FIELD MONITORING 1988
GREEN PEACH APHIDS



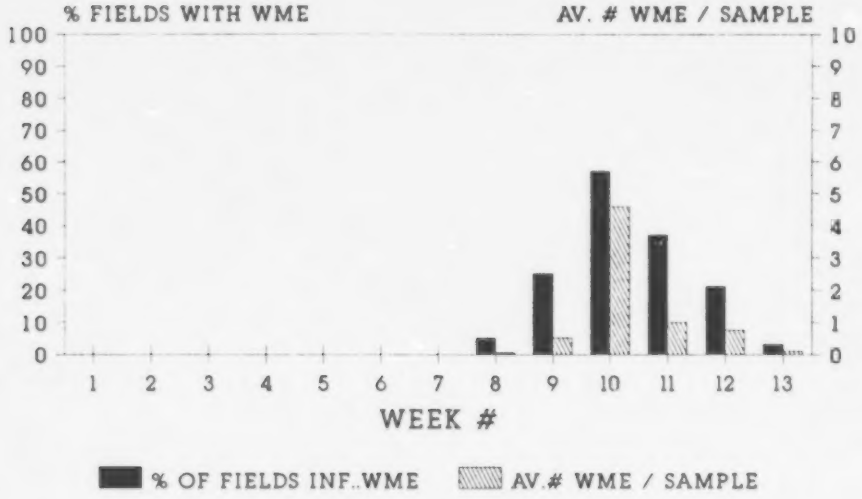
GRAPH #5

FIELD MONITORING 1988
GREEN PEACH APHIDS



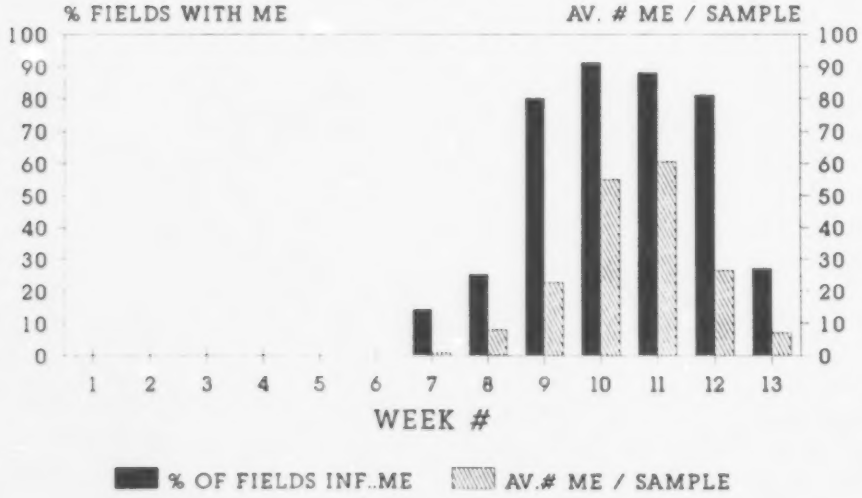
GRAPH #6

FIELD MONITORING 1988
COMMON POTATO APHIDS



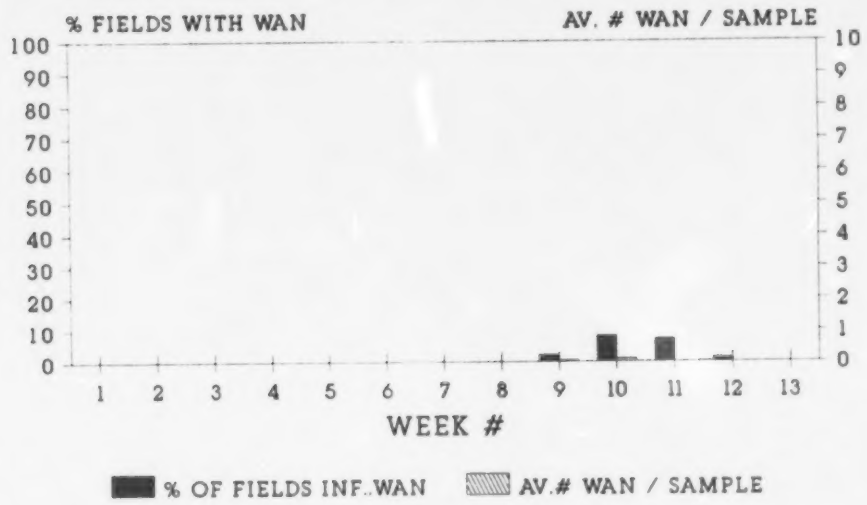
GRAPH #7

FIELD MONITORING 1988
COMMON POTATO APHIDS



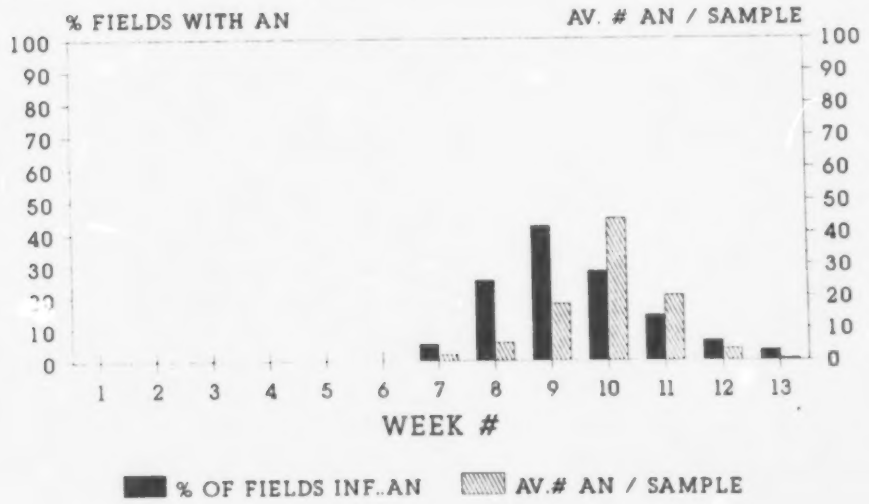
GRAPH #8

FIELD MONITORING 1988
BUCKTHORN APHIDS



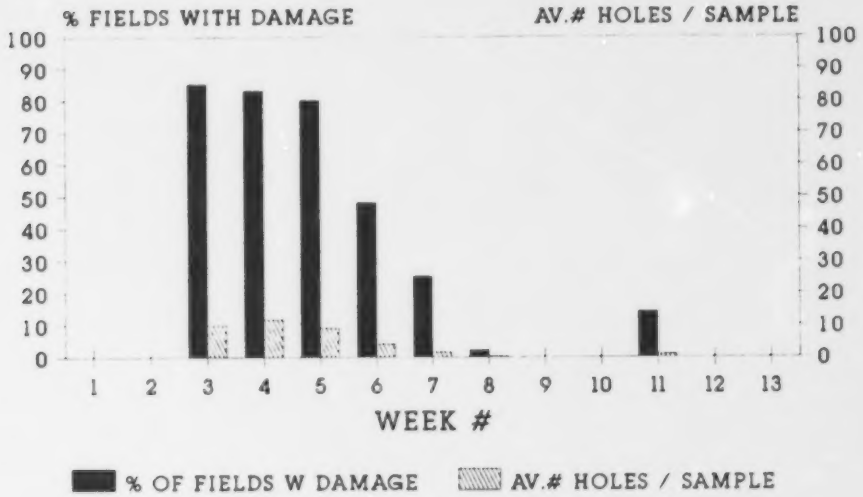
GRAPH # 9

FIELD MONITORING 1988
BUCKTHORN APHIDS



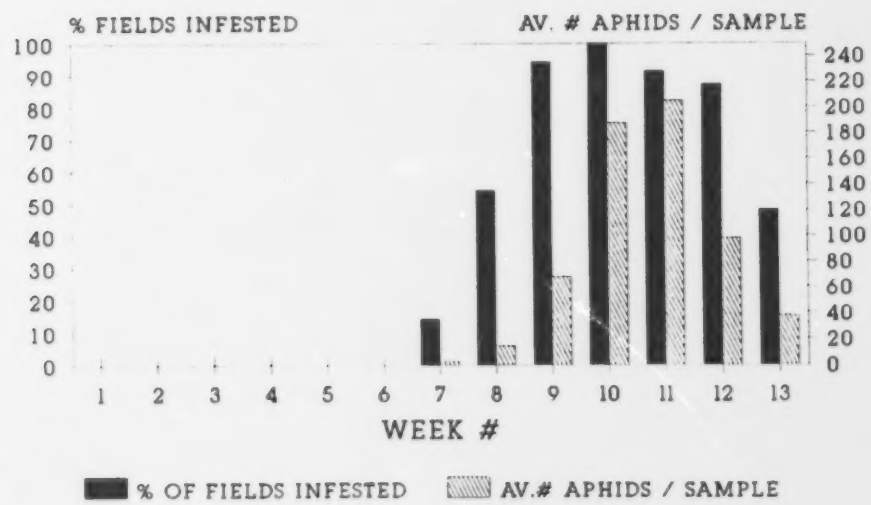
GRAPH #10

FIELD MONITORING 1988
FLEA BEETLE DAMAGE



GRAPH #11

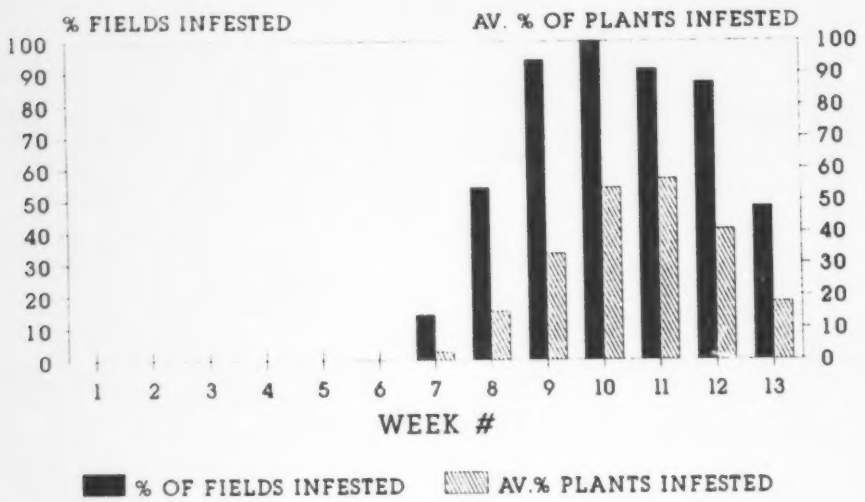
FIELD MONITORING 1988
TOTAL APHID INFESTATIONS



GRAPH #12

FIELD MONITORING 1988

% OF PLANTS INFESTED



INSPECTION OF GREENHOUSES FOR THE PRESENCE OF POTATO INFESTING APHIDS

INSPECTION DES SERRES POUR LA PRESENCE DE PUCERONS INFESTANT LES POMMES DE TERRE

GUY BERNARD

ABSTRACT:

Green peach aphids were found in 14 out of the 27 greenhouses inspected in the spring of 1988. Winged forms of the green peach aphid were also present in 4 of these greenhouses.

RESUME:

Des pucerons verts du pêcher furent détectés dans 14 des 27 serres inspectées au printemps de 1988. Des puçerons verts du pêcher de forme ailée étaient présents dans 4 de ces serres.

Many species of aphids can play a role as vectors of virus diseases. The green peach aphid, in particular, is the principle vector of PLRV (Leafroll) and an efficient vector of PVY (Mosaic) to potatoes. Both diseases can cause yield reductions if seed tubers are affected. In addition, plants of susceptible varieties infected with PLRV will often develop a tuber disorder, known as net necrosis which greatly affects the quality of table and processing potatoes.

These two diseases, leafroll and mosaic, account for a substantial proportion of seed field rejections each year in New Brunswick. Since the tolerance for virus diseases in seed crops is low, seed growers are acutely aware of the potential for disease transmission from aphids alighting in their fields.

The green peach aphid overwinters on peach trees in southern locations. Closer to us, in the State of Maine, it often overwinters on the Canada plum in the form of eggs. In New Brunswick however, the green peach aphid does not ordinarily overwinter on the Canada plum but it can survive the winter in greenhouses.

In a survey of 27 greenhouses, conducted in the potato belt of New Brunswick from June 8th to June 13th, 1988, 14 greenhouses were found to be infested, sometimes heavily, with green peach aphids. Winged forms were present in 4 of these greenhouses. No common potato aphids were found, but wingless forms of the buckthorn aphid were also detected in 3 greenhouses. Green peach aphids were found on a diversity of plants including tomatoes, peppers, cucumbers, marigolds, zinnias, impatients and amaranthus. Since plants from these greenhouses are sold and distributed widely throughout potato growing areas, there is a real danger that the aphids they harbor could become an early source of infestation in seed fields.

Early infestations of seed fields by aphids can substantially increase in-field virus transmission if inoculum levels are high in the crop. Unfortunately, because of a record green peach aphid flight in 1988, high inoculum levels will prevail this coming spring. It is therefore specially important to reduce local sources of green peach aphids in the province this year. To this effect, greenhouse operators will be contacted in the spring of 1989 and will be asked to cooperate by making sure that the plants they sell are free of aphids.

SURVEY OF WIREWORMS IN NEW BRUNSWICK POTATO FIELDS

ENQUETE SUR LA PRESENCE DE TAUPINS DANS LES CHAMPS DE POMME DE TERRE AU NOUVEAU-BRUNSWICK

GUY BERNARD

ABSTRACT:

A survey was conducted in 1988 to determine the relative abundance of wireworms in New Brunswick potato fields. Results are discussed below.

RESUME:

Une enquête fut menée en 1988 pour déterminer l'abondance relative de taupins ou vers fil de fer dans les champs de pommes de terre au Nouveau-Brunswick. Les résultats sont discutés ci-dessous.

In 1988, from May 20th to June 7th, thirty-five potato fields were sampled for the presence of wireworms by sampling and sieving soil to a depth of 12" at 5 locations in each field. Wireworm larvae were found in only 2 fields at a depth of 0 - 6 inches but were found in 14 fields at a depth of 6 - 12 inches. The heaviest infestations were recorded in fields where the previous crops had either been wheat, oats or hay.

Seven grain fields were also sampled. Wireworm larvae were found in 2 of these at a depth of 0 - 6 inches and in 2 fields as well as at a depth of 6 - 12 inches.

Wheat baits were also placed in 19 potato fields at the end of June at 5 locations per field and at 3 - 4 inches under the soil surface. Wireworm larvae were found in 8 of these fields.

Although results for both soil sampling and the use of wheat baits were similar, there were instances where the presence of wireworms was detected by one method and not the other. Improvements in both sampling methods are required as well as a determination of the infestation levels necessary to cause significant damage to the potato crop.

En 1988, à partir du 20 mai jusqu'au 7 juin, 35 champs de pommes de terre furent échantillonnés, pour y déterminer la présence de taupins, en tamisant des échantillons de sol prélevés jusqu'à une profondeur de 12" à 5 endroits différents dans chaque champ.

Des vers fil de fer furent receuillis dans 2 champs à une profondeur de 0 - 6 pouces et dans 14 autres champs à une profondeur de 6 - 12 pouces. Les plus fortes collections émanèrent de champs directement hors de cultures de foin, d'avoine ou de blé.

Sept champs de céréales furent également échantillonnés. On retrouva des vers fil de fer dans deux de ces champs à une profondeur de 0 - 6 pouces et dans 2 autres à une profondeur de 6 - 12 pouces.

Des appâts de blé entier furent également placés à 5 endroits différents et à 3 - 4 pouces sous la surface du sol dans 19 champs de pommes de terre à la fin de Juin. On retrouva des vers fil de fer aux environs des appâts dans 8 de ces champs.

Bien que les résultats de ces différentes méthodes d'échantillonnage furent similaires dans bien des cas, il arriva que la présence de vers fil de fer soit détectée par une méthode et non l'autre. Il est certain que des améliorations sont requises dans les méthodes d'échantillonnage et qu'il faudrait aussi pouvcir déterminer le niveau d'infestation auquel il deviendrait nécessaire de traiter un champ avant d'y planter des pommes de terre.

CHEMICAL CONTROL OF WIREWORMS IN POTATOES

CONTROLE CHIMIQUE DES TAUPINS DANS LES CHAMPS DE POMMES DE TERRE

GUY BERNARD

ABSTRACT:

In 1988, the granular insecticides Thimet 15G, Dyfonate 10G and Di-Syston 15G either banded at planting or soon after emergence were evaluated for the control of wireworm damage in potatoes at four different locations in Carleton County. The results are discussed below.

RESUME:

En 1988, les insecticides granulaires Thimet 15G, Dyfonate 10G et Di-Syston 15G placés en bandes soit à la plantation ou tôt après l'émergence furent évalués pour le contrôle des dommages causés aux tubercules par les taupins, à quatre endroits différents dans le comté de Carleton. Les résultats sont discutés ci-dessous.

Introduction:

Wireworms are the larval stage of the click beetle. They cause damage to potatoes by attacking the roots and the tubers in which they dig tunnels or cavities. Wireworms are present in most soils in low numbers and generally do not cause serious problems to crops. In recent years, however, instances of damage to potatoes have increased and in some lots as much as 40% of the crop, by weight, has been affected. Presently, wireworm problems are limited to about a dozen farms, mostly in Carleton County. It is feared that, with a return to rotation and a lessening of the use of granular insecticides, problems will increase in the future.

Materials and Methods:

In 1988, the granular insecticides Thimet 15G (15.2 kg/ha), Dyfonate 10G (19.9 kg/ha) and Di-Syston 15G (25.7 kg/ha) either banded at planting or soon after emergence were evaluated for the control of wireworm damage to potato tubers at four different locations in Carleton County, New Brunswick.

A randomized complete block design was used and plots consisted of seven treatments replicated three times. Each treatment consisted of four rows, 15 feet in length.

Samples of 100 tubers were harvested from the two middle rows of each plot during the month of September and assessed for signs of damage by wireworms.

Results and Conclusion:

There were no significant differences between the granular insecticide treatments and the no insecticide treatments at two locations where the levels of tuber damage in untreated plots were 16.6 and 12.0 holes per 100 tubers.

There was a significant difference between the Dyfonate at planting and the no insecticide treatment and the Dyfonate post-emergence and the no insecticide treatment at one location, where the level of tuber damage in untreated plots was 45.3 holes per 100 tubers. The Dyfonate at planting and Dyfonate post-emergence reduced damage levels to 21.0 and 17.3 holes per 100 tubers respectively.

At another location where the damage level in untreated plots was 36.6 holes per 100 tubers, several treatments provided some protection. The best treatment at this location was Dyfonate at planting which reduced damage levels to 11.6 holes per 100 tubers.

ANALYSIS OF VARIANCE

EXPERIMENT 1

RANDY McLEAN, WOODSTOCK:

TREATMENT	MEAN (# Holes/100 Tubers)	*HOMOGENEOUS SUBSETS
No Insecticide	16.6	*
Dyfonate Pl.	13.6	*
Thimet Post	11.0	*
Dyfonate Post	8.6	*
Di-Syston Post	8.0	*
Di-Syston Pl.	7.6	*
Thimet Pl.	5.3	*

*Duncan's M R Test .05 Level

ANALYSIS OF VARIANCE

EXPERIMENT 2

LORNE HALLETT, HARTLAND:

TREATMENT	MEAN (# Holes/100 Tubers)	*HOMOGENEOUS SUBSETS
Thimet Pl.	16.6	*
Di-Syston Pl.	13.0	*
No Insecticide	12.0	*
Dyfonate Post	11.6	*
Di-Syston Post	10.0	*
Thimet Post	9.3	*
Dyfonate Pl.	6.0	*

*Duncan's M R Test .05 Level

ANALYSIS OF VARIANCE

EXPERIMENT 3

CRAIG DICKINSON, JACKSONVILLE:

TREATMENT	MEAN (# Holes/100 Tubers)	*HOMOGENEOUS SUBSETS	
No Insecticide	45.3	*	
Thimet Post	37.6	*	*
Di-Syston Post	31.0	*	*
Thimet Pl.	28.3	*	*
Di-Syston Pl.	24.3	*	*
Dyfonate Pl.	21.0		*
Dyfonate Post	17.3		*

*Duncan's M R Test .05 Level

ANALYSIS OF VARIANCE

EXPERIMENT 4

RALPH CARPENTER, WOODSTOCK:

TREATMENT	MEAN (* Holes/100 Tubers)	*HOMOGENEOUS SUBSETS		
No Insecticide	36.6	*		
Di-Syston Post	28.6	*	*	
Thimet Pl.	26.3	*	*	
Thimet Post	24.0		*	
Difonate Post	19.3		*	*
Di-Syston Pl.	17.0		*	*
Dyfonate Pl.	11.6			*

*Duncan's M R Test .05 Level

AN INVESTIGATION OF THE EFFECTS OF ORGANIC FERTILIZERS ON THE PRODUCTION OF SHEPODY SEED POTATOES IN NEW BRUNSWICK

UNE ENQUETE SUR LES EFFETS DES FERTILISANTS ORGANIQUES SUR LA PRODUCTION DE POMMES DE TERRE DE SEMENCE DE VARIETE SHEPODY AU NOUVEAU-BRUNSWICK

BY

GARY HAWKINS *

ABSTRACT

A replicated experiment was conducted on the farm of Conrad and Claude Toner, in Grand Falls New Brunswick to evaluate the effects of applying six fertility treatments on the growth and yield of the potato cultivar Shepody. The treatments included four approved organic fertilizers; 10 T/A composted cow manure, plus three commercially available products prepared from seafood by products applied at a rate of 1- T/A; Crab Meal, Herring Scales and Shrimp Meal. The performance of these fertilizers was compared with that of 120 lb./acre chemical N-P-K and untreated control plots in which no fertilizer was added.

There was no significant difference in yield between the various organic treatments which produced less than both the chemically fertilized treatments and the untreated control. This yield difference was probably due to the application of copper sulfate as a control for Late Blight which severely damaged the organic plots after an application in early August following which the plants did not fully recover. The crab meal produced the highest yield followed by composted manure and shrimp meal with fish scales resulting in the lowest yield.

The tuber defects and diseases were examined and large differences were noted particularly with respect to the occurrence of common scab which was most prevalent in tubers produced in the crab meal plots with only slight scab found on tubers from the untreated control plots.

The use of these materials in commercial potato production appeared to be feasible when compared with composted manure based on a single year of evaluation however the natural soil fertility was high and could obviously produce at least a reasonable yield for one year without any fertilizer addition. It is recommended therefore that the evaluation be carried out for several years at the same location maintaining individual plot identities to determine the possible long term affects.

* Note: This work was initiated by David Cozac, Stu Fleishhaker and Conrad Toner of Sustainable Agriculture for the Valley Ecosystem.

RÉSUMÉ:

Une étude répliquée fut faite sur la ferme de Conrad et de Claude Toner à Grand Sault au Nouveau-Brunswick pour évaluer l'effet de six fertilisants différents sur la croissance et le rendement en tubercules du cultivar Shepody. Les traitements inclurent quatre fertilisants organiques approuvés: 10 T/A de fumier de vache composté ainsi que trois produits commerciaux à base de sous-produits de poissons ou fruits de mer appliqués au taux de 1 T/A. Ces produits étaient la moulée de crabe, les écailles de harengs et la moulée de crevettes. Les résultats obtenus avec ces produits furent comparés à ceux obtenus dans la parcelle recevant 120 lb/Acre de N-P-K chimique et à ceux d'une parcelle n'ayant recu aucun fertilisant.

Il n'y eut aucune différence de rendement entre les différents traitements organiques mais ceux-ci par contre eurent des rendements inférieurs à ceux ayant recu des fertilisants chimiques ou n'ayant recu aucun fertilisant.

On attribue cette perte de rendement à l'utilisation du Sulfate de cuivre qui fut utilisé pour contrôler le mildiou.

Une application de ce produit faite au début d'Août sur les parcelles organiques causa des dommages sévères à la récolte. La moulée de crabe produit les plus hauts rendements, suivie par le fumier décomposé, la moulée de crevettes et finalement par les écailles de harengs.

On évalua également les maladies et défectuosités et on nota de grosses différences particulièrement pour la gale des tubercules, qui était beaucoup plus prononcée dans les parcelles ayant recu de la moulée de crabe. Il n'y avait que trés peu de gale sur la parcelle non fertilisée.

Il sembla possible que ces produits puissent être utilisés avec avantage lorsque comparés au fumier décomposé si on ce base sur une seule année d'évaluation. La fertilité naturelle du sol étaient haute et produit des rendements raisonnables pour une première année, mêmes sans addition de fertilisant. On recommande donc que cette étude soit continuée pour plusieurs années au même endroit en maintenant l'identité des parcelles individuelles afin de pouvoir en déterminer les effets à long terme.

INTRODUCTION

A recent study on organic agriculture prepared for Agriculture Canada by Baseline Market Research Ltd. of Fredericton,N.B. contained many interesting findings. Consumer attitudes were surveyed through a series of focus groups in five Canadian cities along with a telephone survey of 1000 urban Canadian households. The results of the research indicated that there is a significant market potential for organic food products and that the price differential should not exceed 25%.

The production of a high yielding crop of potatoes without the addition of fairly large amounts of chemical fertilizers in the upper Saint John River valley appeared to be unlikely. The right combination of rotational crops, seed preparation, cultivar selection and intensive management can all help to improve the non-chemical crop yields. The addition of fertilizer of some type is necessary in N.B. soils to expect long term crop production with potatoes. Traditionally the most popular non-chemical fertilizer applied to potatoes has been manure from various sources. The addition of manure has not been without problems. Increases in the occurrence of Rhizoctonia and Common Scab have be found to be associated with manure application along with the handling problems due to its bulk and increased weed problems.

Members of Sustainable Agriculture For The Valley Ecosystem (S.A.V.E.); David Cozac, Stu Fleishhaker and Conrad Toner were interested in evaluating some alternative fertilizer products to manure for their usefulness in potato production. This project was partially funded through the Agri-Food Development Agreement under the Technology Demonstration Program. The remaining funds were provided by S.A.V.E.

MATERIALS AND METHODS

The potato cultivar Shepody was grown in a replicated experiment in which the following fertilizer treatments were evaluated:

FERTILITY TREATMENTS:

1) 10 tons /acre of composted cow manure

2) 1 ton / acre finely ground crab meal

3) 1 ton / acre finely ground shrimp meal

4) 1 ton / acre finely ground herring scales

5) 120 lb / acre chemical N-P-K

6) control plots without addition of fertilizer

A completely randomized plot design was utilized to compare the treatments. The seafood products, supplied by Emery Leblanc,WE Acres Farms and chemical fertilizer were applied using a conventional two row potato planter with the hilling disks removed to keep the rows open for hand planting. The composted manure was weighed into barrels and the equivalent of 10 t/a, was applied evenly to each plot, rototilled in and the planter was used to make the rows for hand planting. Seed was placed at 12 inch spacing.

Cultivation was the only form of weed control used and only fungicides were applied to prevent Late Blight infection. Dithane M45 was used on the chemical plots and copper sulfate (Bordeaux Mixture) was applied to the organic treatments. No application of any kind was made to the untreated plots except for cultivation and hilling. Bordeaux mixture has since been disapproved for use on organically certified produce due to the possible build-up of copper in the soil and residues in the produce.

The vines were removed on August 24 according to the recommended N.B. mandatory topkill dates by hand pulling.

The harvest of individual plots was weighed and electronically graded into 6 seed size categories, tubers were counted and the occurrence of scab and rhizoctonia was quantified.

Leaves were sampled from each treatment and analyzed at the N.B.Dept.of Agriculture Soils Laboratory for nutrients refer to table 2.

RESULTS

The results of this experiment are presented in the tables and figures that follow.

TABLE 1 SUMMARY OF TUBER BORNE DISEASES

PERCENT OF TUBERS HAVING ANY LESIONS

TYPE OF FERTILIZER	COMMON SCAB (%)	RHIZOCTONIA (%)
CRAB MEAL	60 (SEVERE)	20
HERRING SCALES	20 (SLIGHT)	8
MANURE	30 (SOME SEVERE)	-
SHRIMP MEAL	35 (FEW / TUBER)	5
CHEMICAL FERTILIZER	35	-
UNTREATED	15 (VERY SLIGHT)	-

TABLE 2: NUTRIENT ANALYSIS

	PERCENT					PPM				
FERTILIZER	N	P	K	Ca	Mg	Zn	B	Cu	Mn	Fe
CRAB MEAL	5.7	1.60	.45	12.9	.60	67	--	47	61	698
FISH SCALES	11.2	3.90	.08	8.6	.20	165	--	71	26	763

TABLE 3 ADEQUATE LEVELS-MIDSEASON TISSUE ANALYSIS

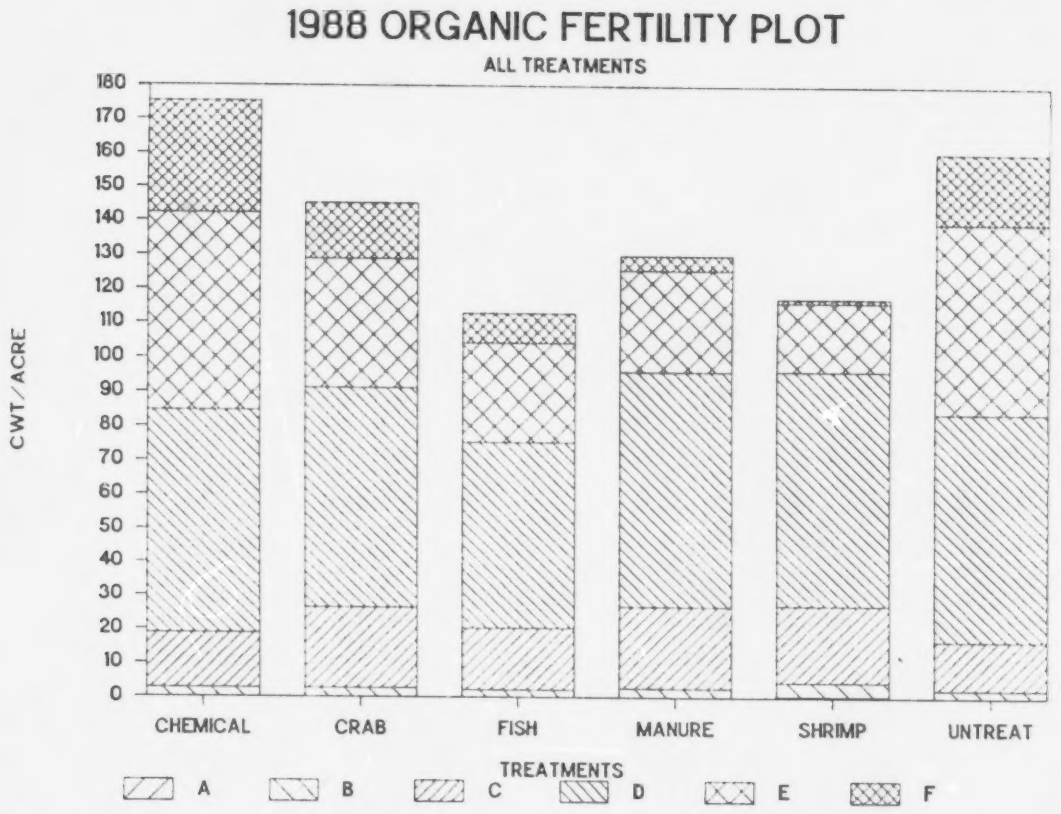
N - 4.6 - 6.0 %
P - 0.18 -0.22 %
K - 2.8 - 4.5 %

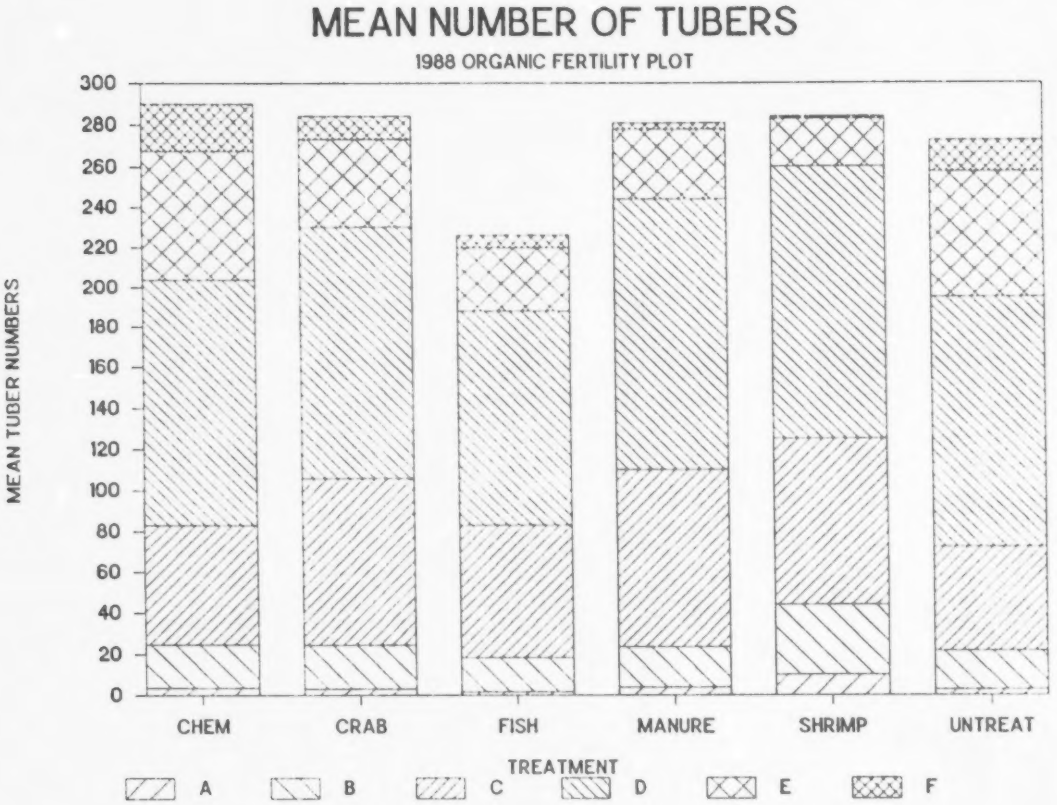
Ca - 0.36 - 0.50 %
Mg - 0.17 - 0.22 %

Mn - 20 - 200 ppm
Fe - 30+ ppm
Bo - 14 - 40 ppm
Cu - 7 - 30 ppm
Zn - 30 - 100 ppm

ALL TREATMENTS

VARIETY	CLASS	CHEM CWT/ ACRE	CRAB CWT/ ACRE	FISH CWT/ ACRE	MANURE CWT/ ACRE	SHRIMP CWT/ ACRE	UNTREAT CWT/ ACRE
SHEPODY	A <28MM	0.14	0.12	0.08	0.15	0.37	0.13
	B 28MM-35MM	2.60	2.62	1.99	2.49	4.10	2.36
	C 35MM-45MM	16.11	23.66	18.19	24.18	22.48	14.25
	D 45MM-55MM	65.79	64.73	55.13	69.15	69.14	67.26
	E 55MM-65MM	57.69	37.66	28.86	29.66	20.07	55.60
	F >65MM	33.19	16.44	8.63	4.33	1.19	20.95
	TOTALS :	175.52	145.22	112.88	129.96	117.35	160.55


1988 ORGANIC FERTILITY PLOT
ALL TREATMENTS
CWT / ACRE
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
CHEMICAL
CRAB
FISH
MANURE
SHRIMP
UNTREAT
TREATMENTS
A
B
C
D
E
F


MEAN NUMBER OF TUBERS
1988 ORGANIC FERTILITY PLOT
MEAN TUBER NUMBERS
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
CHEM
CRAB
FISH
MANURE
SHRIMP
UNTREAT
TREATMENT
A
B
C
D
E
F

GREENHOUSE TISSUE

TEST REPORT

Plant Industry Branch

N. B. Department of Agriculture

P.O. Box 6000, Fredericton, N. B.

TO: C. Toner

DATE COLLECTED:

LAB NO.:

LAB #	HOUSE #	CROP	%					ppm				
			N	P	K	Ca	Mg	Zn	B	Cu	Mn	Fe
ug. 2/88		Potatoes-Untre	4.6	.33	2.7	1.4	.48	19	24	41	39	103
3/88		Potatoes-manure	4.7	.38	3.0	1.5	.51	17	24	250	37	108
4/88		Potatoes-fish scale	6.2	.52	2.7	1.3	.57	26	14	230	65	105
5/88		Potatoes-shrimp meal	5.2	.41	2.2	1.6	.60	24	20	265	39	96
6/88		Potatoes-chemical	5.5	.38	2.2	1.6	.61	24	19	23	117	88
7/88		Potatoes-other	4.9	.37	3.9	1.2	.44	21	17	180	70	98
8/88		Potatoes-crabmeal	5.2	.46	2.8	1.4	.57	20	17	325	41	96

CONCLUSIONS

Based on a single year of evaluation Crabbe meal, shrimp meal and herring scales could all be applied using a conventional potato planter. Fertilizer flow gate or belt speed modifications are necessary to deliver sufficient quantities of these materials due to their relatively low density compared with chemical fertilizers.

A single year is insufficient to properly evaluate the potential usefullness of these materials and obviously the long term effects have not been determined. Although not evaluated in this experiment there may be benefits in combining the application of the fishery by products with composted manure. This should be investigated in the future along with a repeat of this experiment.

At the current cost of $190/ton these materials are approximately 40% higher at a rate of 1 t/A than the average cost of chemical fertilizer, if assumed to be $135/A. This cost will limit the rate which may feasibly be applied. Due to the potential usefullness in livestock and aquaculture feed and chemical industry uses the cost of the products may increase to the point where application to potatoes would be prohibitively expensive.

TABLE 2: NUTRIENT ANALYSIS

	PERCENT					PPM				
FERTILIZER	N	P	K	Ca	Mg	Zn	B	Cu	Mn	Fe
CRAB MEAL	5.7	1.60	.45	12.9	.60	67	--	47	61	698
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Ca - 0.36 - 0.50 %
Mg - 0.17 - 0.22 %

Mn - 20 - 200 ppm
Fe - 30+ ppm
Bo - 14 - 40 ppm
Cu - 7 - 30 ppm
Zn - 30 - 100 ppm

POTATO VARIETY MANAGEMENT PROFILE DEVELOPMENT
AGRI-FOOD DEVELOPMENT AGREEMENT
PROJECT

DEVELOPPEMENT D'UN PROFILE DE GESTION
POUR LES VARIETES DE POMMES DE TERRE

BY

GARY HAWKINS

ABSTRACT

A three part project was conducted to research and develop information on the management of potato cultivars for the production of seed potatoes and a production survey of 30 seed potato fields in New Brunswick was completed. Ten cultivars were investigated in a replicated experiment to determine the most appropriate of three rates of applied fertility 80,120 and 160 lb./acre N-P-K at three within row seed spacings of 6,8 and 10 inches. Generally the lowest rate of applied fertility 80 lb./acre and the closest seed spacing of 6 inches resuslted in higher than or equivalent total yield and yield of tubers less than 55 mm. The other benefits realized as a result of reduced fertility included greater ease of topkill an less clinging of tubers to stolons due to earlier maturity.

The literature was reviewed to compile information on the management and characteristics of potato cultivars being grown in New Brunswick with the objective of developing management profiles.

Thirty seed production fields were surveyed to determine yield which was graded into six size categories as well as the plant stand and stem numbers. Growers who participated in the survey were provided with a report on each of their fields in addition to their standing relative to the average of all fields sampled of the same variety.

The combination of seed spacing and fertility which produced the highest total yield and yield of tubers less than 55mm. in size were as follows:

	FERTILITY (LB./A)	SEED SPACING (IN.)
Alpha	80	8
Atlantic	80	10
Bintje	80	8
Brador	80	6
Chieftain	80	6
Kennebec	80	6
Red Gold	80	10
Red Pontiac	80	8
Rhine Red	80	6
Viking	80	6

In an examination of all cultivars at all treatment combinations the incidence of growth cracks was least at 6 inch seed spacing and 80 lb./acre of N-P-K and greatest at 10 inches and 160 lb./acre N-P-K.

In an examination of total yield for all treatments combined there was no significant difference in yield between 80 and 120 lb./acre of applied N-P-K but both significantly out yielded 160 lb./acre. Similarly the closest seed spacing of 6 inches significantly outyielded 8 inch which outproduced 10 inch seed spacing.

RÉSUMÉ:

Une étude en trois parties fut entreprise afin d'obtenir plus d'information sur la gestion de cultivars de pommes de terre de semence. Ou fit également une enquête dans 30 champs de semence pour en évaluer la production. Dix cultivars furent évalués dans des parcelles expérimentales afin de pouvoir déterminer les taux de fertilisant les plus appropriés à chacun. Les taux étaient de 80, 120 et 160 lb/acre à trois espacement différents, soit 6, 8 et 10 pouces à l'intérieur du rang. Les meilleurs résultats ou des résultats équivalents pour les rendements totaux ou de tubercules inférieurs à 55 mm. furent généralement obtenus à des taux de 80 lb/acre et un espacement de 6 po. Ce niveau réduit de fertilité contribua également des avantages tels la facilité de défanage et la facilité de détachement du stolon qui sont une conséquence d'une meilleure maturité.

Ou fit également une revue de la littérature afin de compiler le plus d'information possible sur les cultivars présentement cultivés au Nouveau-Brunswick. Cette étude eut pour but la formulation de normes de gestion pour ces variétés.

Les rendements furent également évalués dans trente champs de pommes de terre. Ou receuilla des données sur la densité des plants, le nombre de tiges et les rendements en tubercules classifiés en six catégories d'après leur taille. On fournit aux cultivateurs participants un rapport sur chacun de leurs champs ainsi qu'une mesure relative de leurs résultats comparés à la moyenne des autres champs de la même varieté.

Les taux et espacements les plus propices à l'obtention des plus hauts rendements totaux ou rendements en tubercules inférieurs à 55 m furent:

	Fertilité (lb/A)	espacement (po.)
Alpha	80	8
Atlantic	80	10
Bintje	80	8
Brador	80	6
Chieftain	80	6
Kennebec	80	6
Red Gold	80	10
Red Pontiac	80	8
Rhine Red	80	6
Viking	80	6

Pour l'ensemble des cultivars et des traitements combinés, le taux d'incidence de tubercules fendus fut moindre au taux de 80 lb/acre de N-P-K avec un espacement de 6 pouces et le plus élevé au taux de 160 lb/acre de N-P-K à un espacement de 10 pouces.

Pour ce qui concerne le rendement total pour tous les traitements combinés, il n'y eut aucune différence significative entre les taux de 80 et de 120 lb/acre de N-P-K. Il y eut par contre une diminution significative des rendements au taux de 160 lb/acre.

Similairement, les rendements à un espacement de 6 pouces furent significativement supérieurs à ceux obtenus à un espacement de 8 pouces. De même, les rendements obtenus à 8 pouces furent significativement supérieurs à ceux obtenus à un espacement de 10 pouces.

INTRODUCTION

Potato varieties often differ greatly in their required management practices. Production parameters such as within-row seed spacing, fertility, seed size, seed preparation, planting and harvest dates all have significant effects on total and marketable yields. In the current free variety system in Canada (ie.without Plant Breeders' Rights Legislation) limited seed supply of new high demand varieties creates a definite price advantage for the initial producer. This price advantage is very often short lived as many producers enter the same market with the same variety without any control over the supply.

This situation dictates that a progressive seed growers must constantly try new varieties to maintain a market advantage. This in turn means that growers are producing varieties for which there is little or no management information available, especially that which is produced under New Brunswick growing conditions.

The objective of this project was threefold;

1. To conduct a management experiment with 10 cultivars with the aim of determining the most appropriate within row seed spacing and fertility for seed potato production.

2. To search and assemble existing information from local and other sources on these and other cultivars.

3. To conduct a production survey of several N.B. export seed producers to determine yields and plant stands to investigate how closely the producers intended plant population reflected the actual situation.

MATERIALS AND METHODS

Ten cultivars were evaluated utilizing a randomized split-split plot design with 4 replications. The treatments included fertility as the main plot, cultivar as the sub-plot and within-row seed spacing as the sub-sub plot (plot diagram fig.1)

TREATMENTS

APPLIED FERTILITY:

533 LB./ACRE 15-15-15 (80 LB./A - N-P-K)
800 LB./ACRE 15-15-15 (120 LB./A - N-P-K)
1067 LB./ACRE 15-15-15 (160 LB./A - N-P-K)

CULTIVARS:

ALPHA
ATLANTIC
BINTJE
BRADOR
CHIEFTAIN
KENNEBEC
RED GOLD
RED PONTIAC
RHINE RED
VIKING

WITHIN-ROW SEED SPACING:

6 INCHES (15 CM.)
8 INCHES (20 CM.)
10 INCHES (25 CM.)

To minimize the variation, cut sets were prepared from uniformly graded 3.5 to 4 oz. seed tubers by cutting in half from the bud end to the stem end. Seed pieces were coated with a commercial seed piece treatment and allowed to suberize. Fertilizer was applied using a commercial planter and seed was placed by hand.

Throughout the growing season data was collected the relative dates of emergence, plant stand, dates of tuber initiation, and dates of flowering.

The experiment was aerially sprayed with insecticide and fungicide to prevent plant damage by equipment and all varieties were chemically killed at 90 days to simulate a typical seed production season. Observations were made on the relative ease of topkill between varieties and treatments.

Following harvest individual tubers were weighed, counted and graded using an electronic balance-microcomputer interface and the variety unique size weight relationship. This relationship was determned by weighing 10 representative tubers of each of the desired sizes and averaging. The sizes considered were <28mm.,28-35mm.,35-45mm.,45-55mm.,55-65mm and >65mm. Tubers were examined for tuber borne diseases and defects such as common scab, rhizoctonia and growth cracks and the levels observed were quantified.

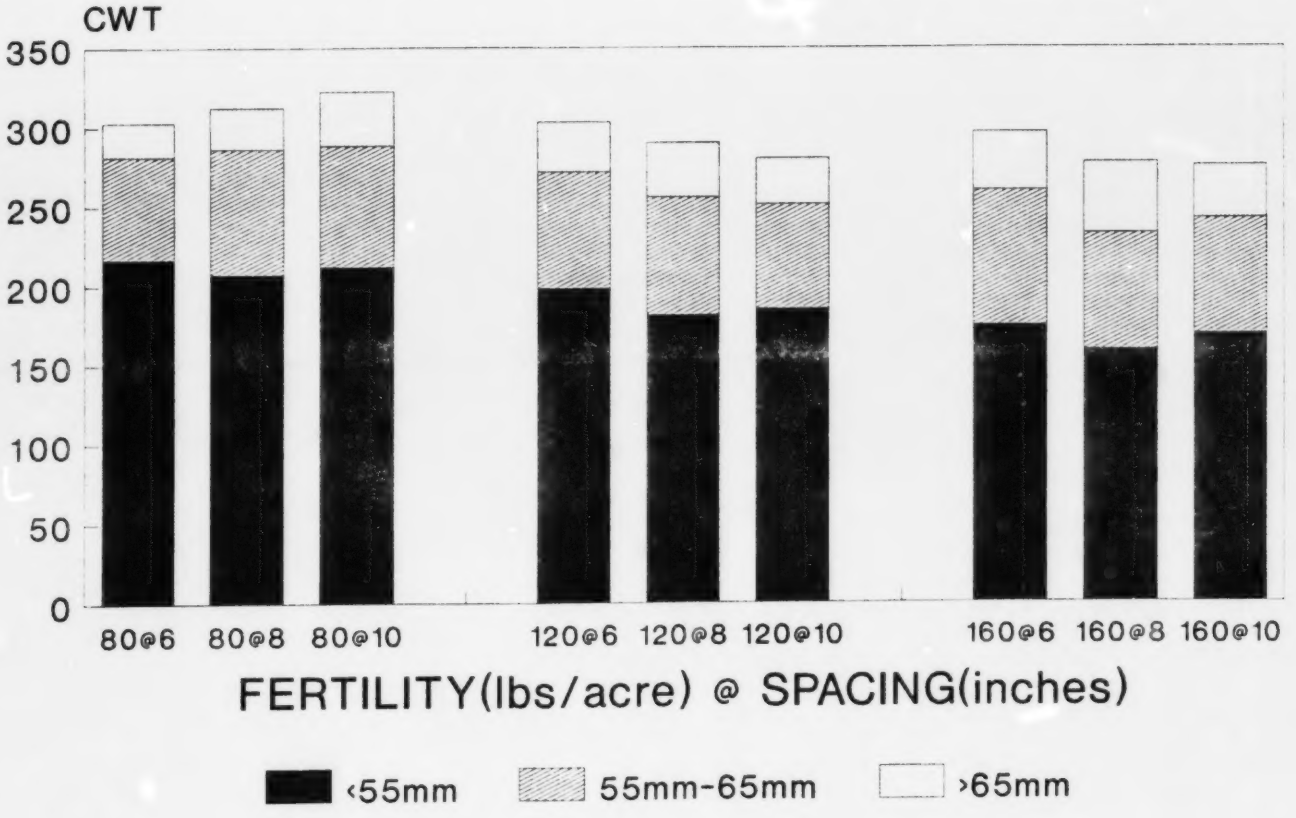
RESULTS

The results of this experiment are presented in the following figures and tables. For all cultivars 80 lb./acre N-P-K resulted in the highest total yield and yield of tubers less than 55mm. in size. This rate also produced tubers with the least defects ie. growth cracks and the plants were easier to topkill and harvest as vines were smaller and tubers did not cling to the stolons. These results are only based data from a single year and it is necessary to repeat the experiment. Another factor which influences the evaluation of applied fertility is the field history and the starting soil fertility levels. Soil analysis indicated that levels of phosphate and potash were both very high as with many N.B. potato fields.

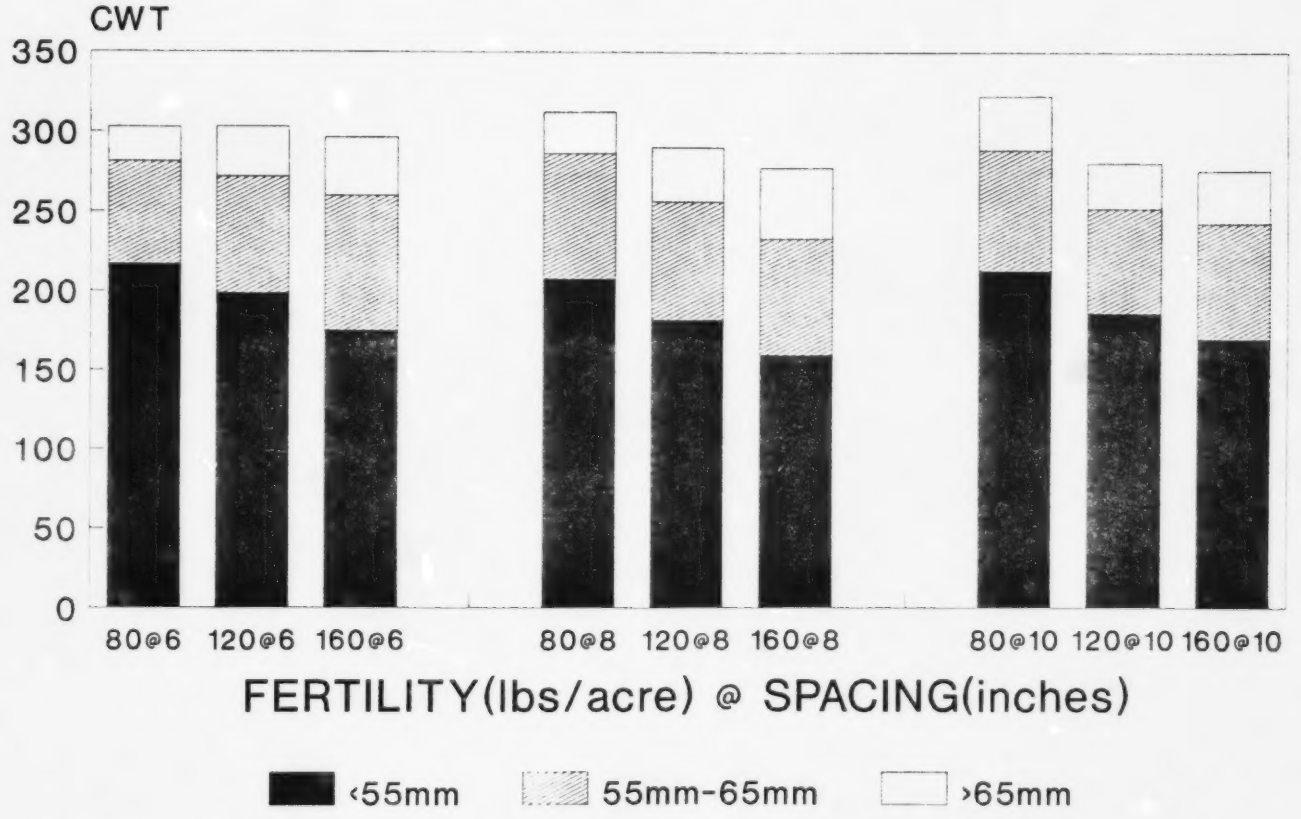
With respect to within row seed spacing for the cultivars; Brador, Chieftain, Kennebec, Rhine Red, and Viking a six inch seed spacing resulted in the highest total yield and yield of tubers under 55mm. For the varieties; Alpha, Bintje and Red Pontiac the best seed spacing was eight inches. With Atlantic and Red Gold 10 inch spacing resulted in the highest yield but the greater chance of growth cracks and probable increase in hollow heart must be considered.

The general trend of lowest applied fertility and closest seed spacing in the production of growth cracks was not always the case when each cultivar was examined such as brador.

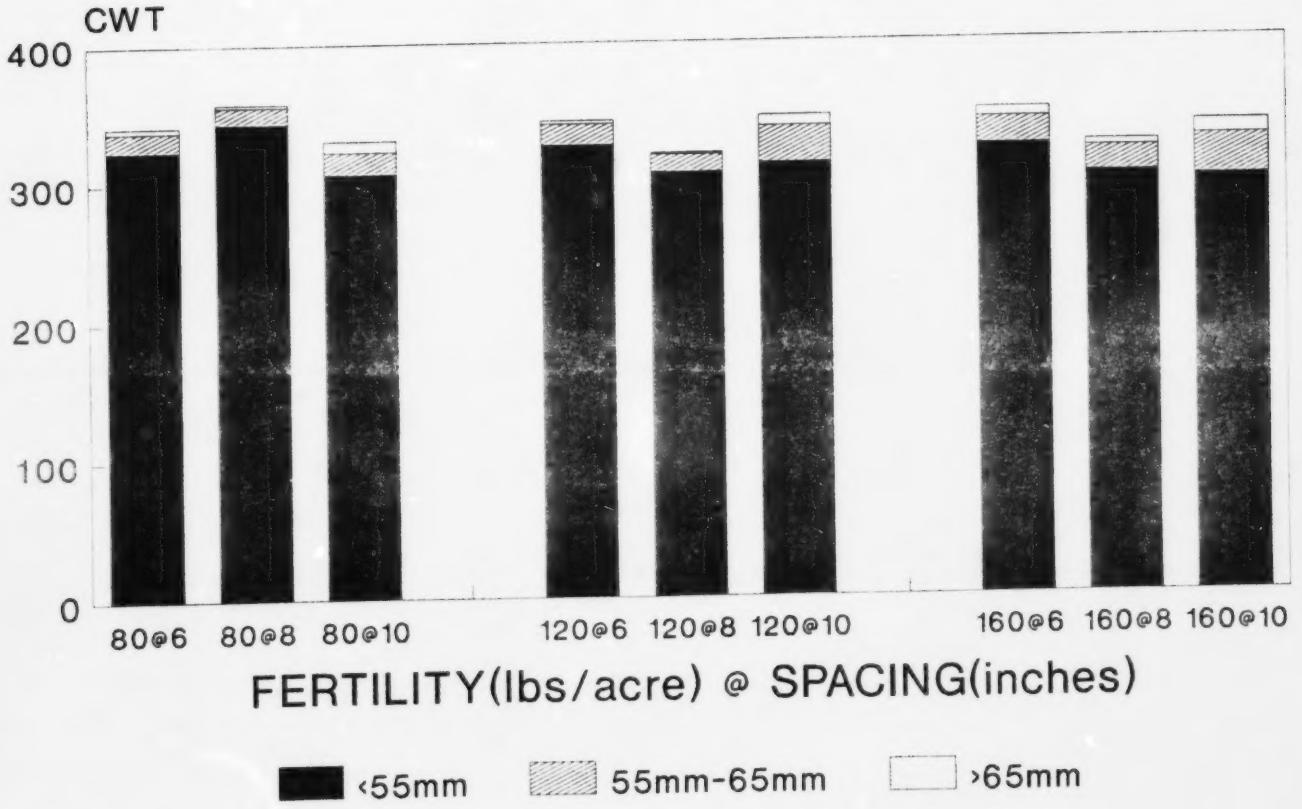
ATLANTIC(GROUPED BY FERTILITY)
1988 VARIETY MANAGEMENT AND EVALUATION



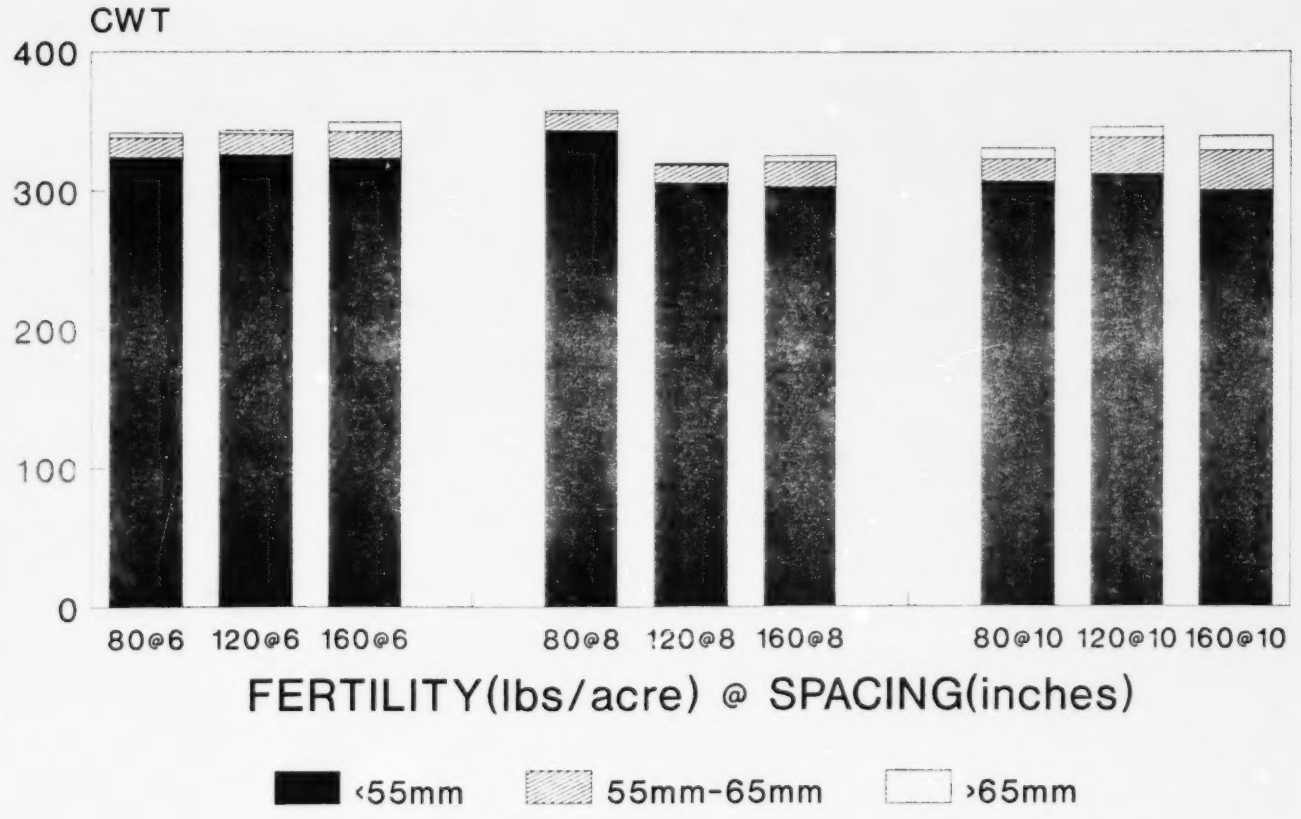
ATLANTIC(GROUPED BY SPACING)
1988 VARIETY MANAGEMENT AND EVALUATION



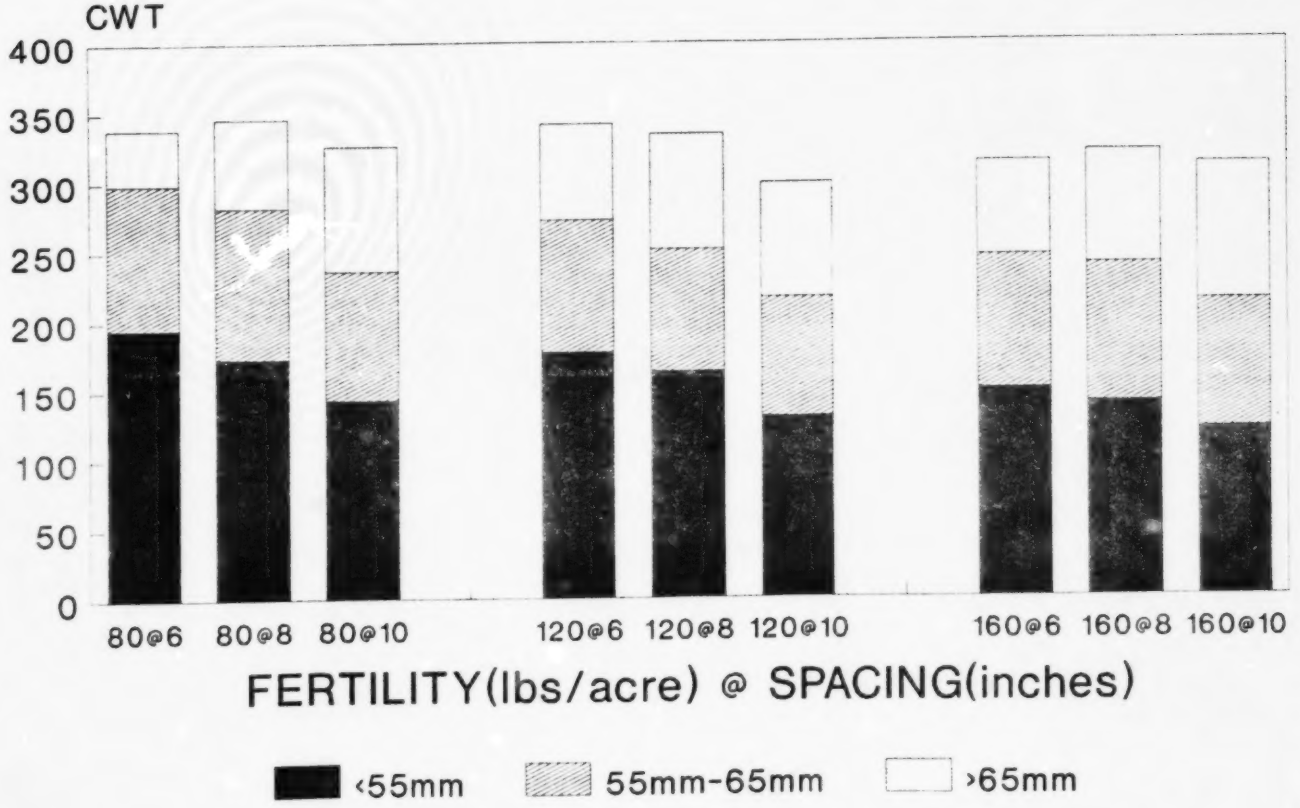
BINTJE(GROUPED BY FERTILITY)
1988 VARIETY MANAGEMENT AND EVALUATION



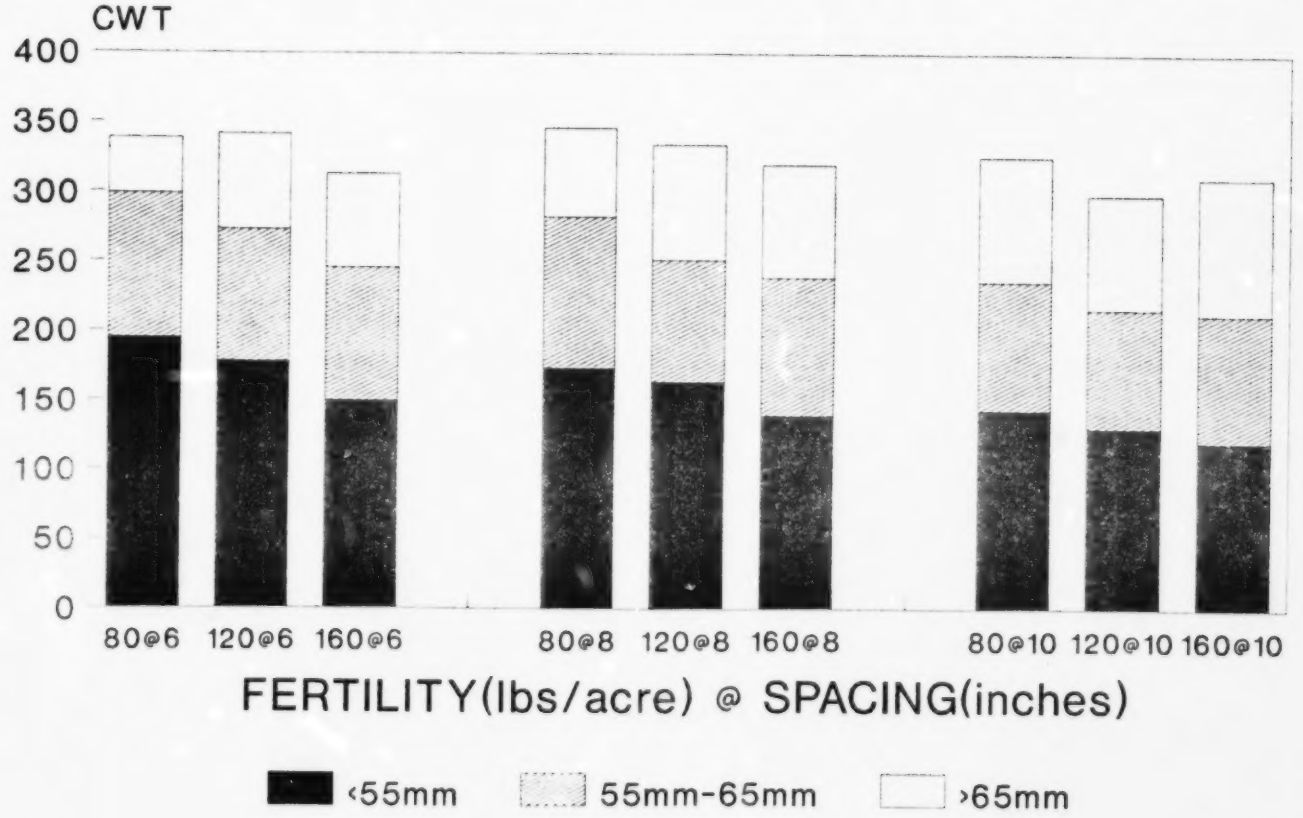
BINTJE(GROUPED BY SPACING)
1988 VARIETY MANAGEMENT AND EVALUATION



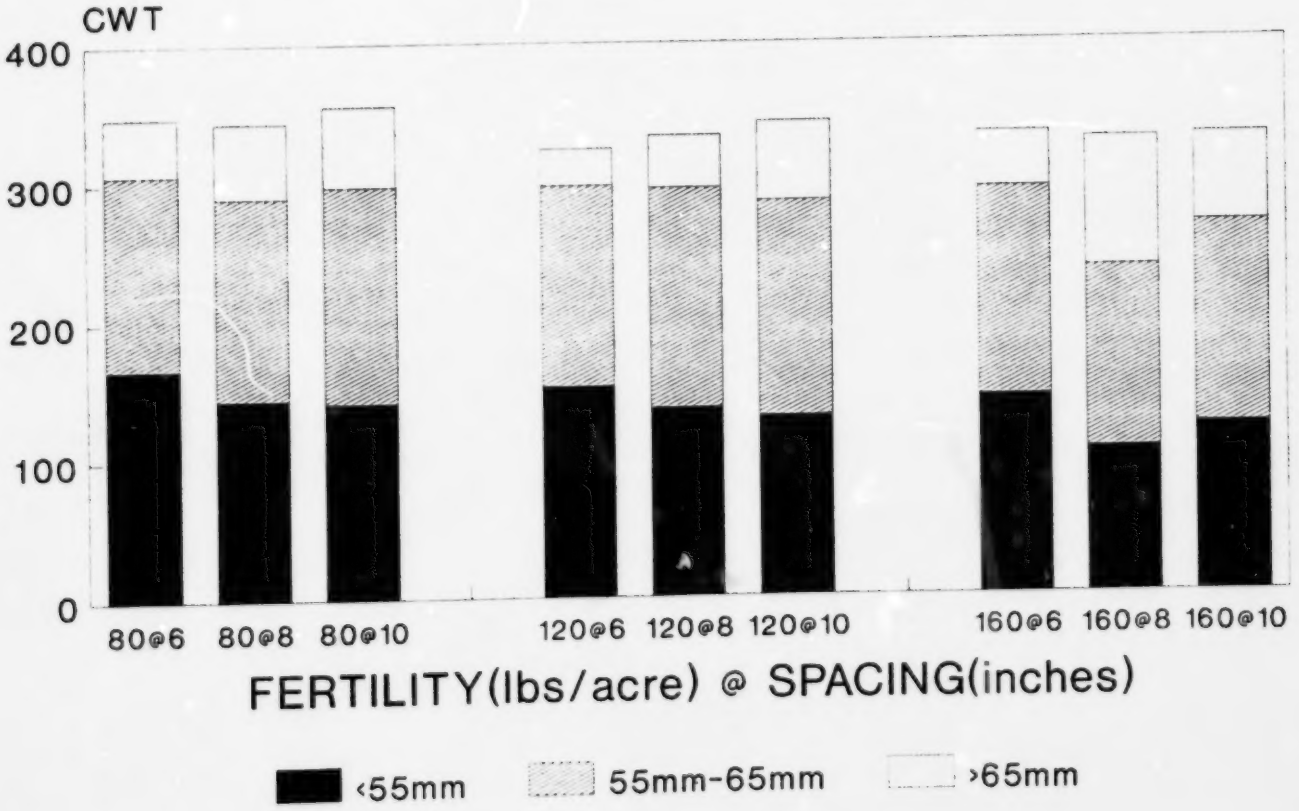
BRADOR(GROUPED BY FERTILITY)
1988 VARIETY MANAGEMENT AND EVALUATION



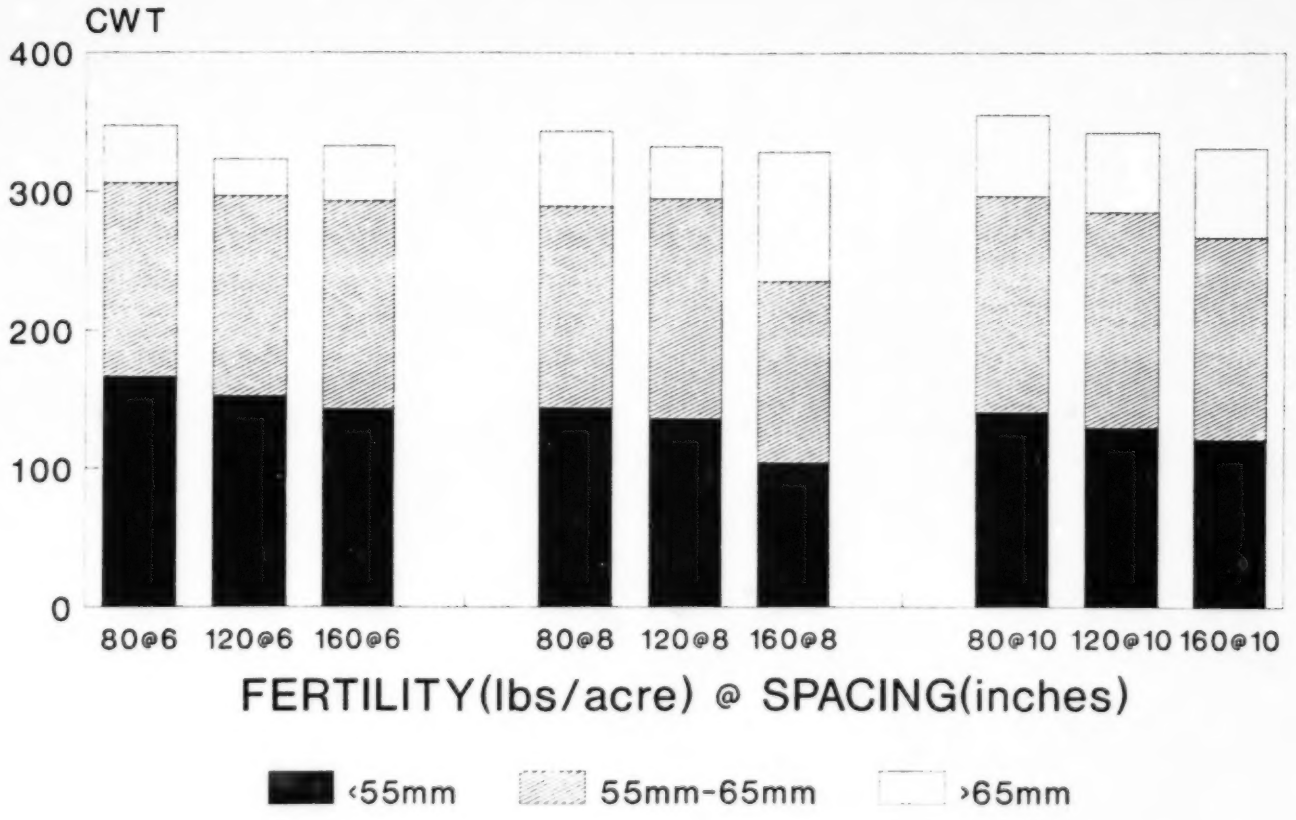
BRADOR(GROUPED BY SPACING)
1988 VARIETY MANAGEMENT AND EVALUATION



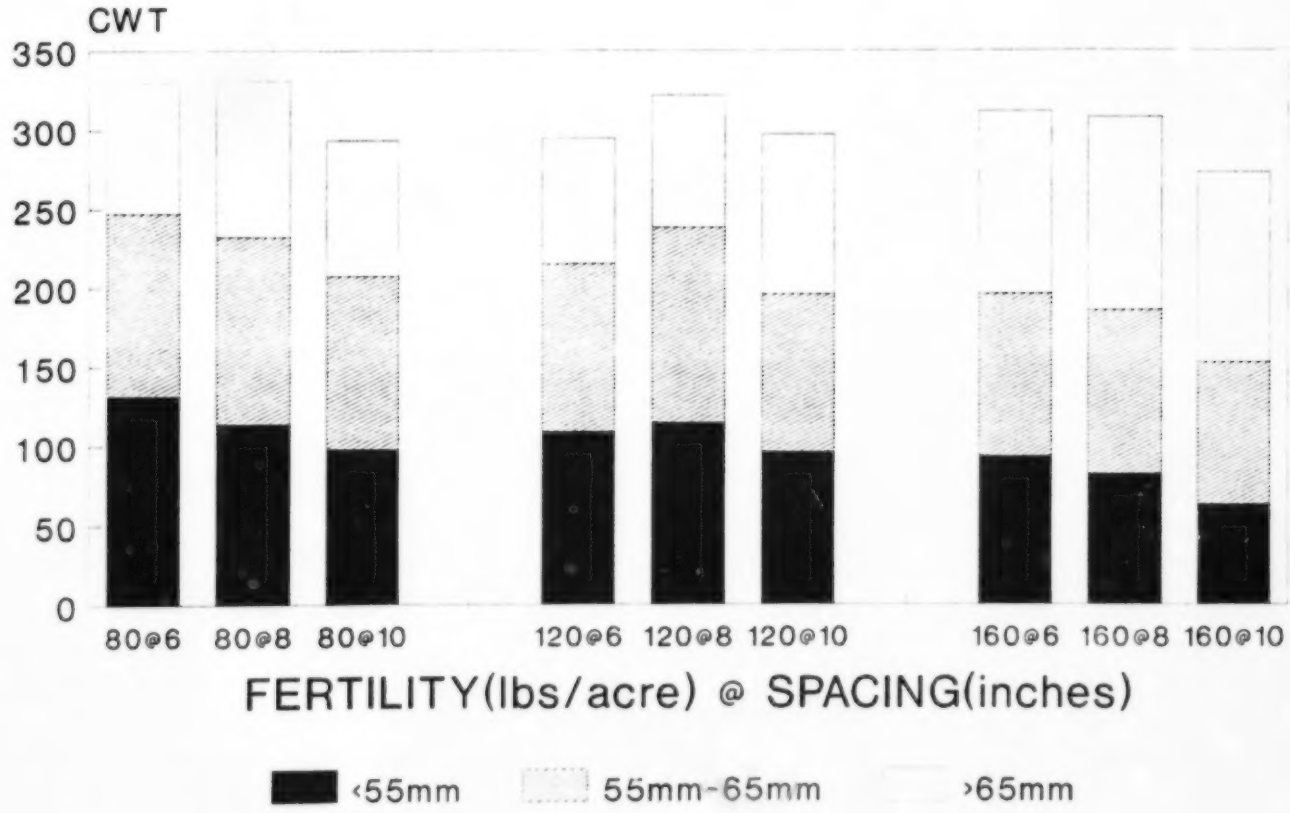
CHIEFTAN(GROUPED BY FERTILITY)
1988 VARIETY MANAGEMENT AND EVALUATION



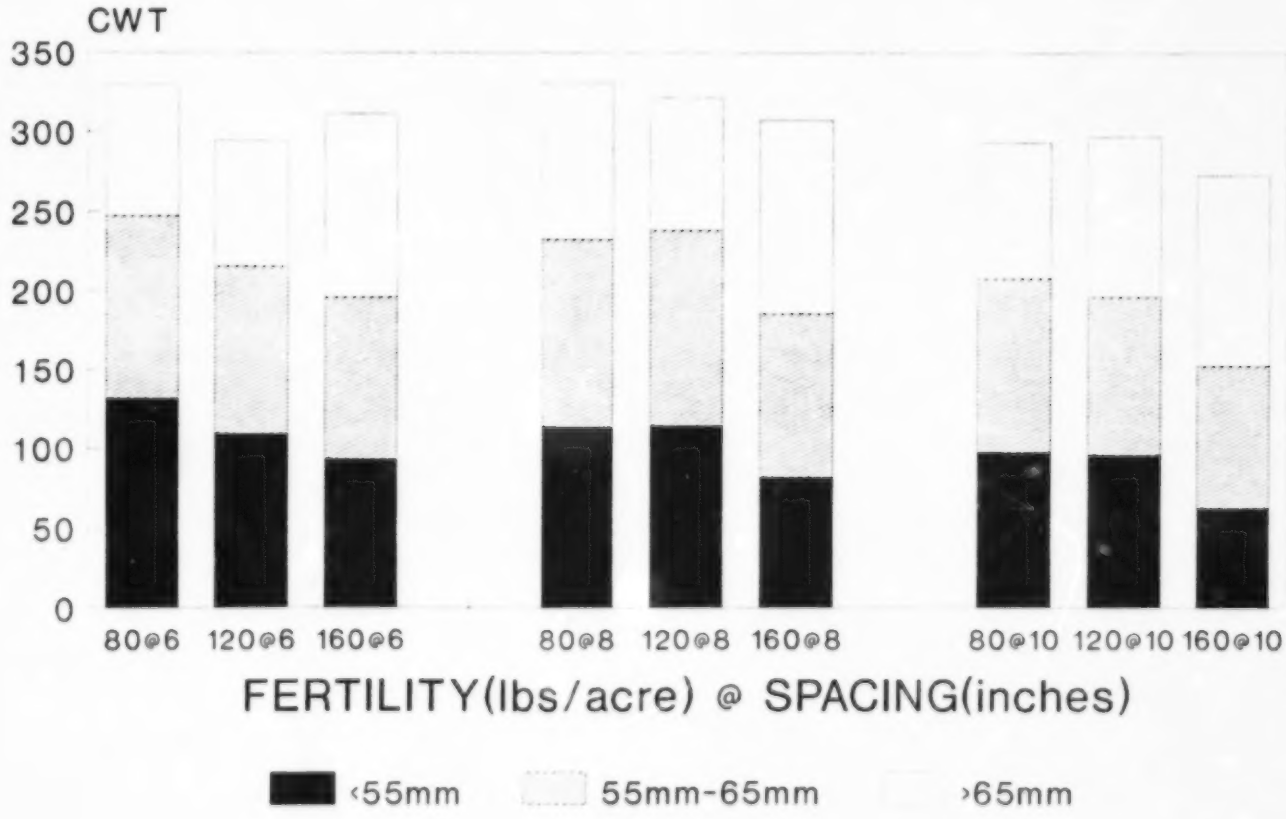
CHIEFTAN(GROUPED BY SPACING)
1988 VARIETY MANAGEMENT AND EVALUATION



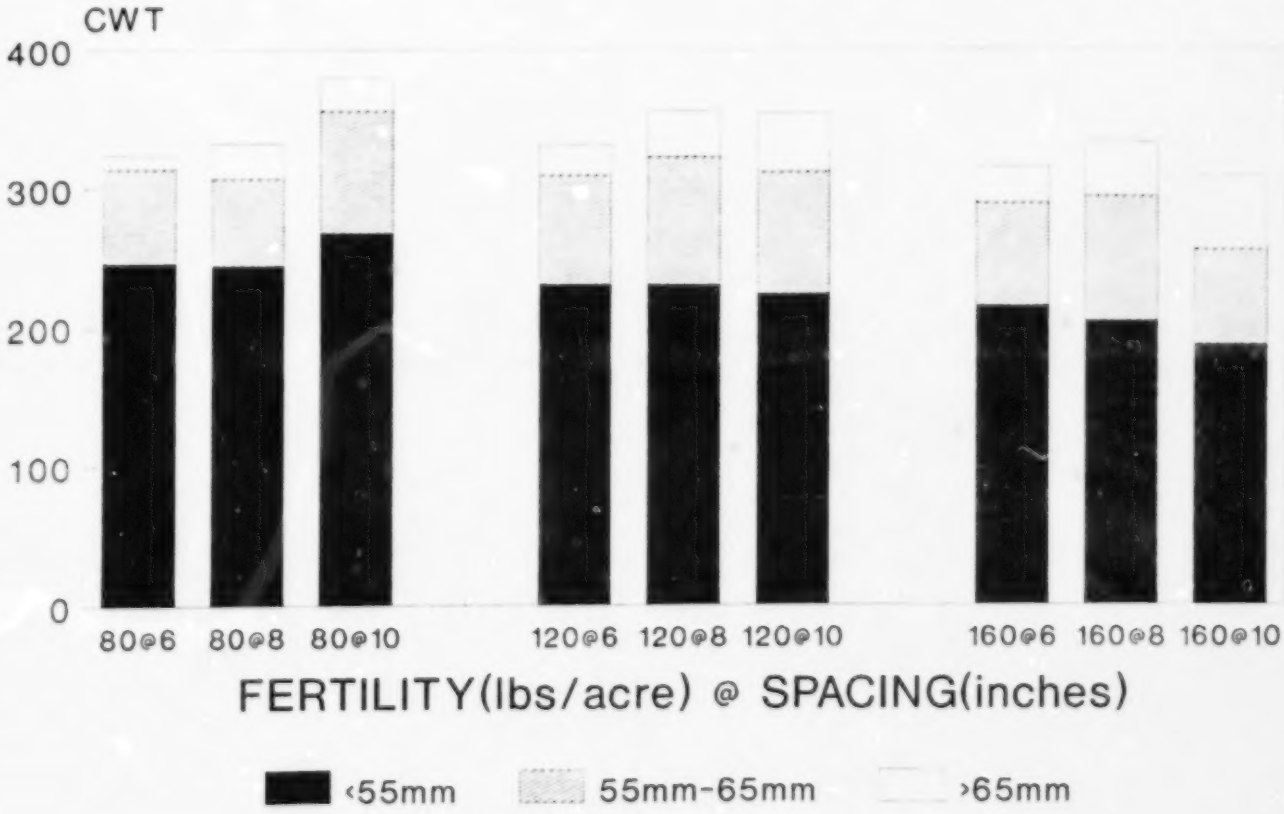
KENNEBEC(GROUPED BY FERTILITY)
1988 VARIETY MANAGEMENT AND EVALUATION



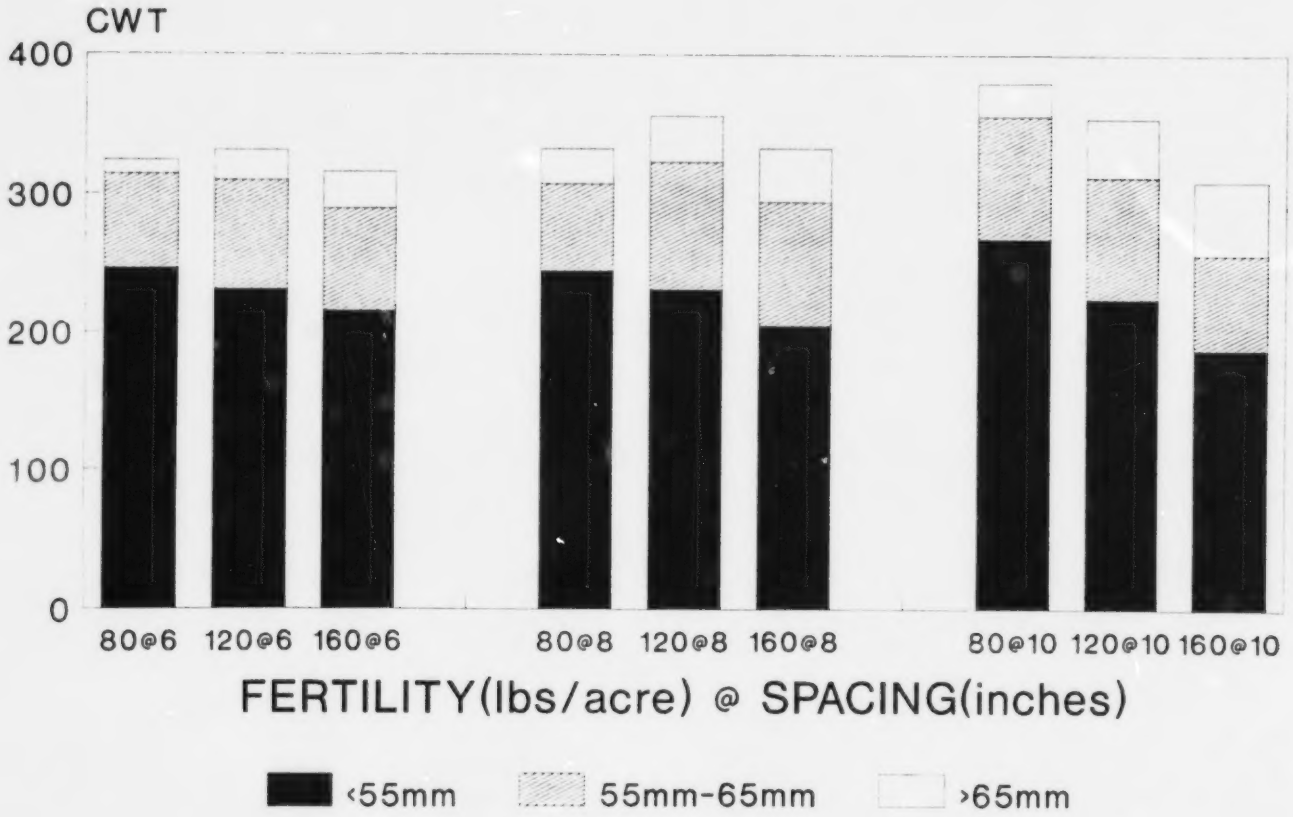
KENNEBEC(GROUPED BY SPACING)
1988 VARIETY MANAGEMENT AND EVALUATION



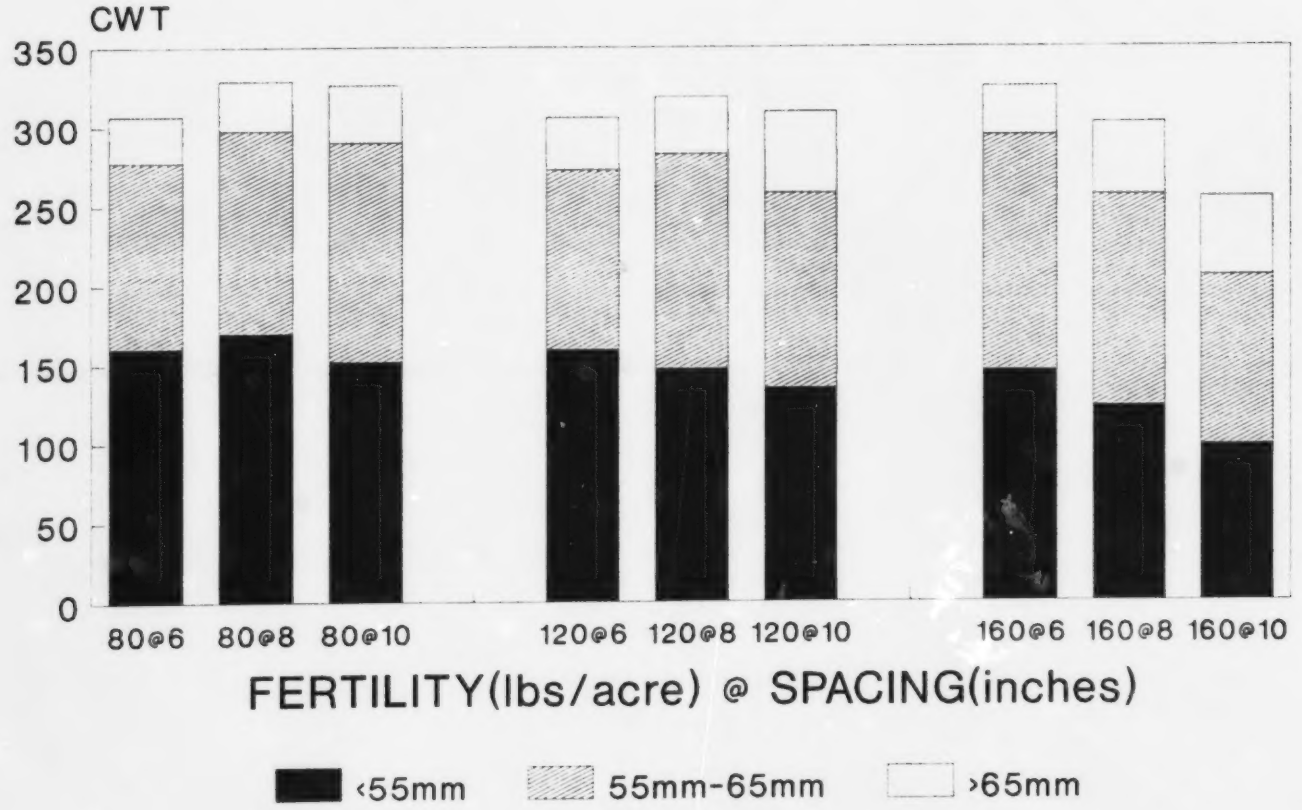
RED GOLD(GROUPED BY FERTILITY)
1988 VARIETY MANAGEMENT AND EVALUATION



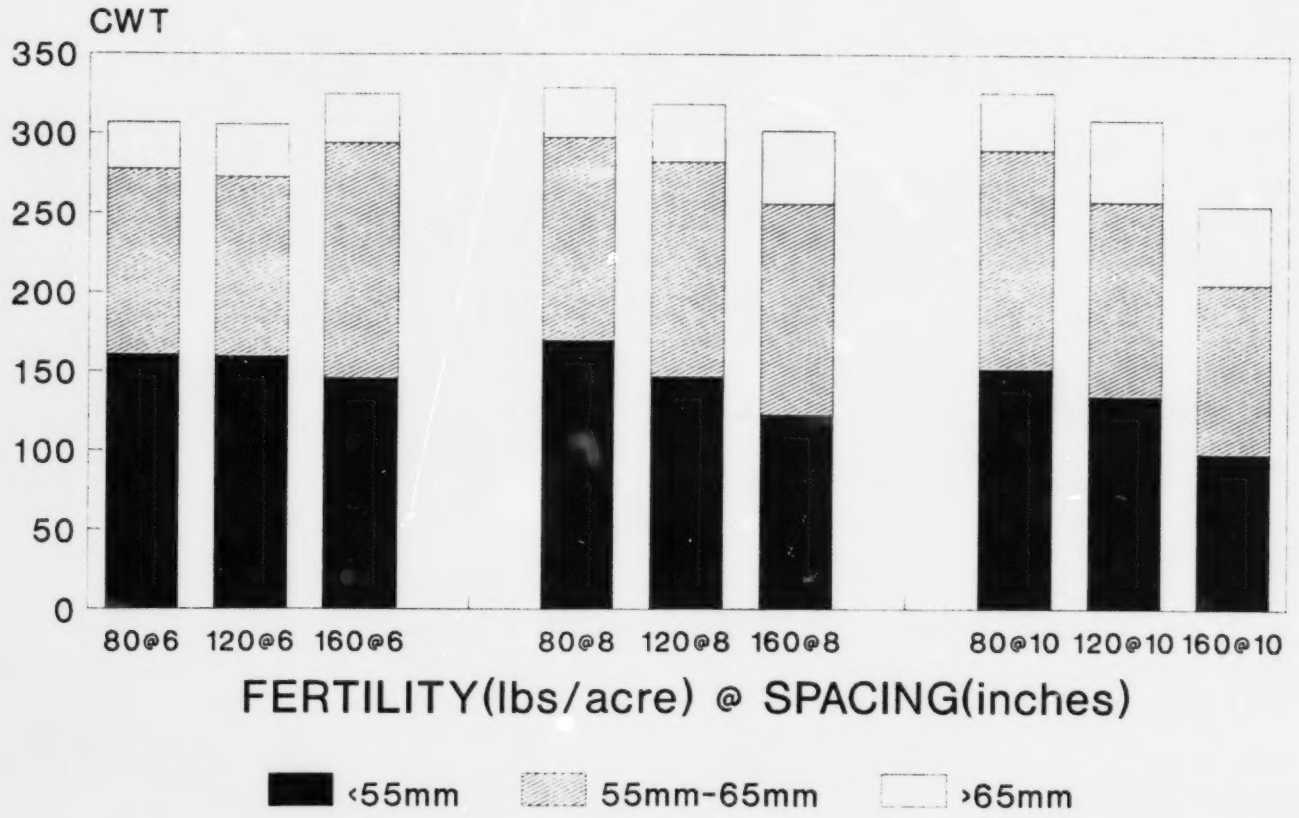
RED GOLD(GROUPED BY SPACING)
1988 VARIETY MANAGEMENT AND EVALUATION



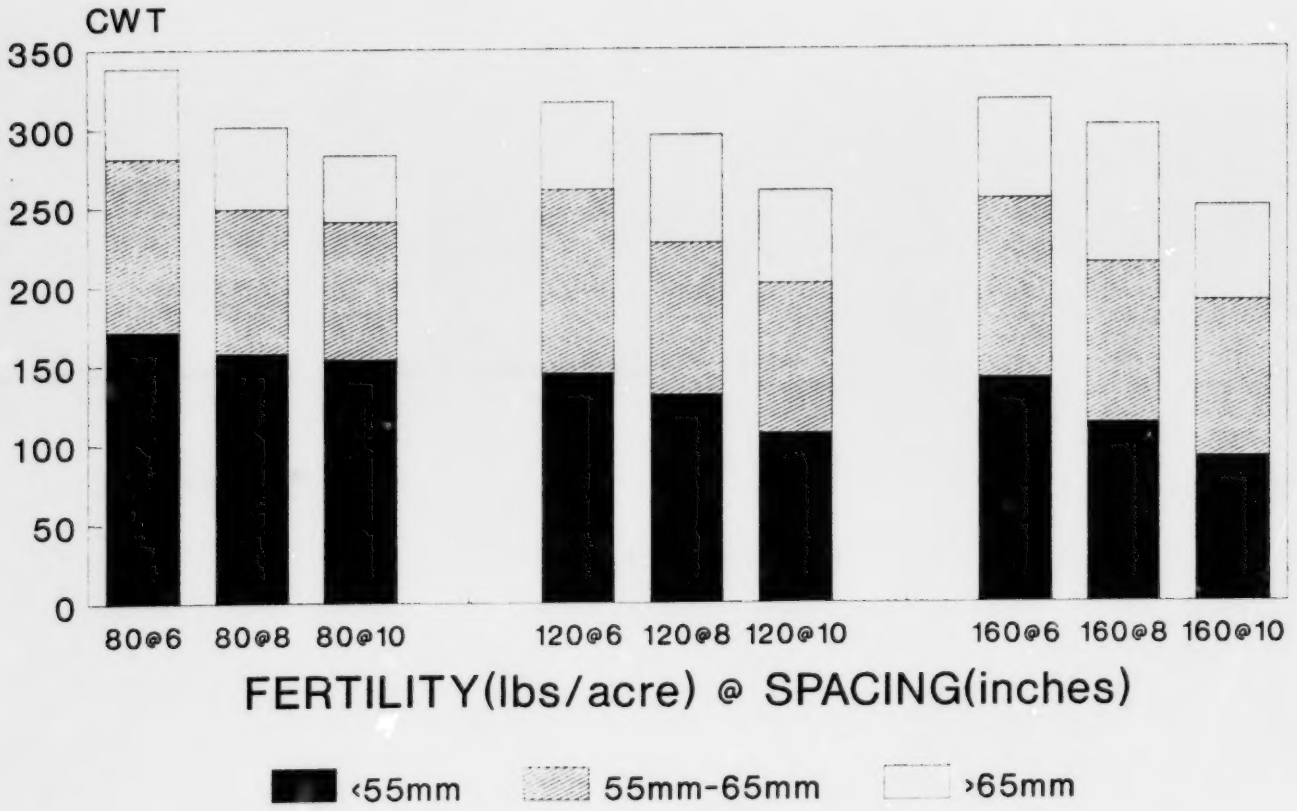
RED PONTIAC(GROUPED BY FERTILITY)
1988 VARIETY MANAGEMENT AND EVALUATION



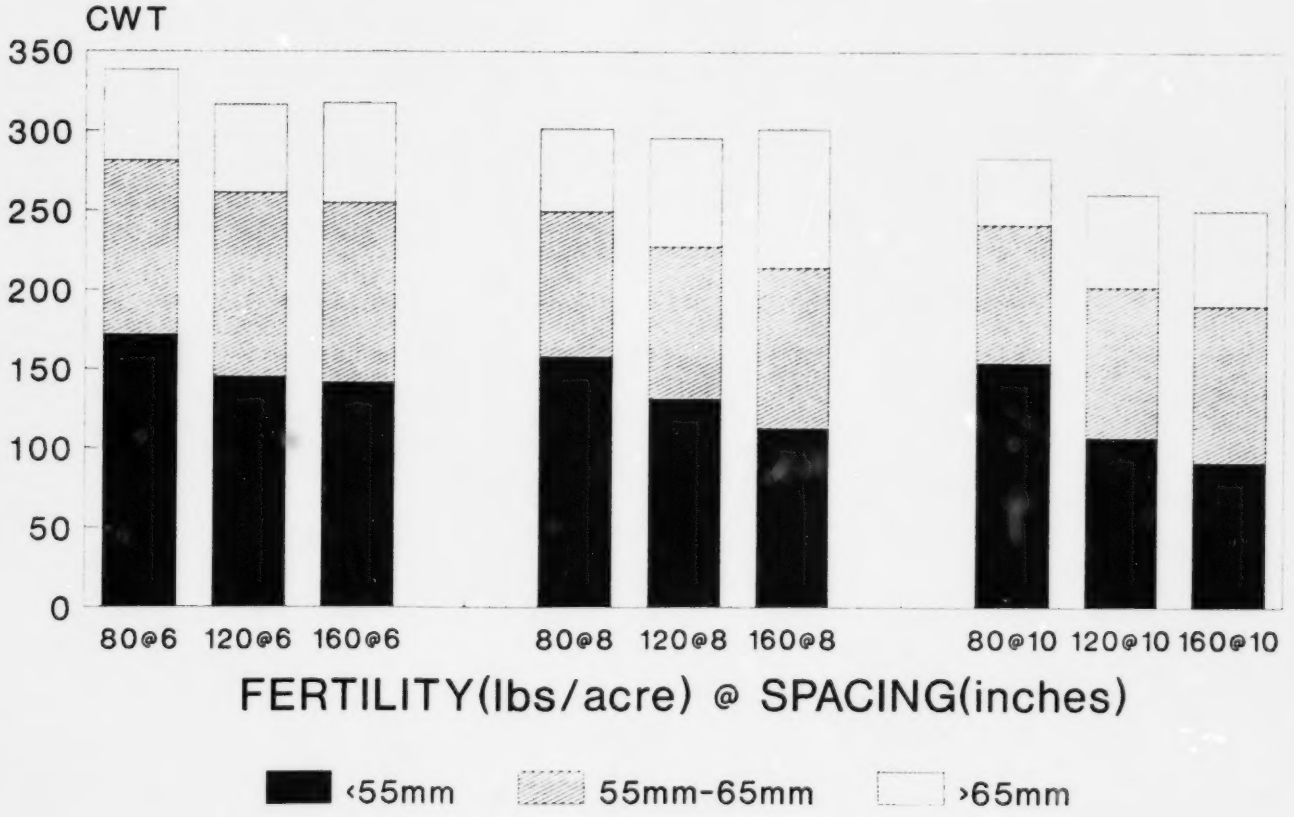
RED PONTIAC(GROUPED BY SPACING)
1988 VARIETY MANAGEMENT AND EVALUATION



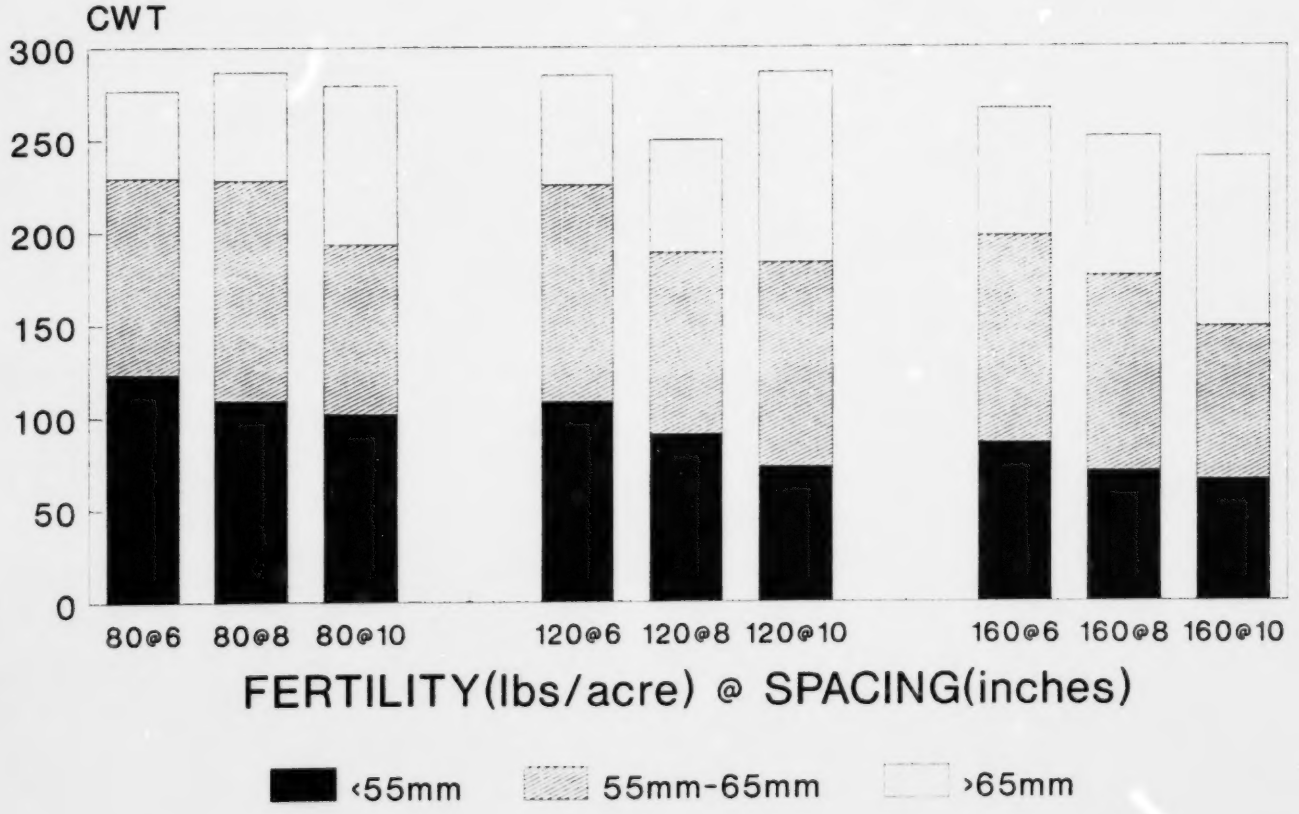
RHINE RED(GROUPED BY FERTILITY)
1988 VARIETY MANAGEMENT AND EVALUATION



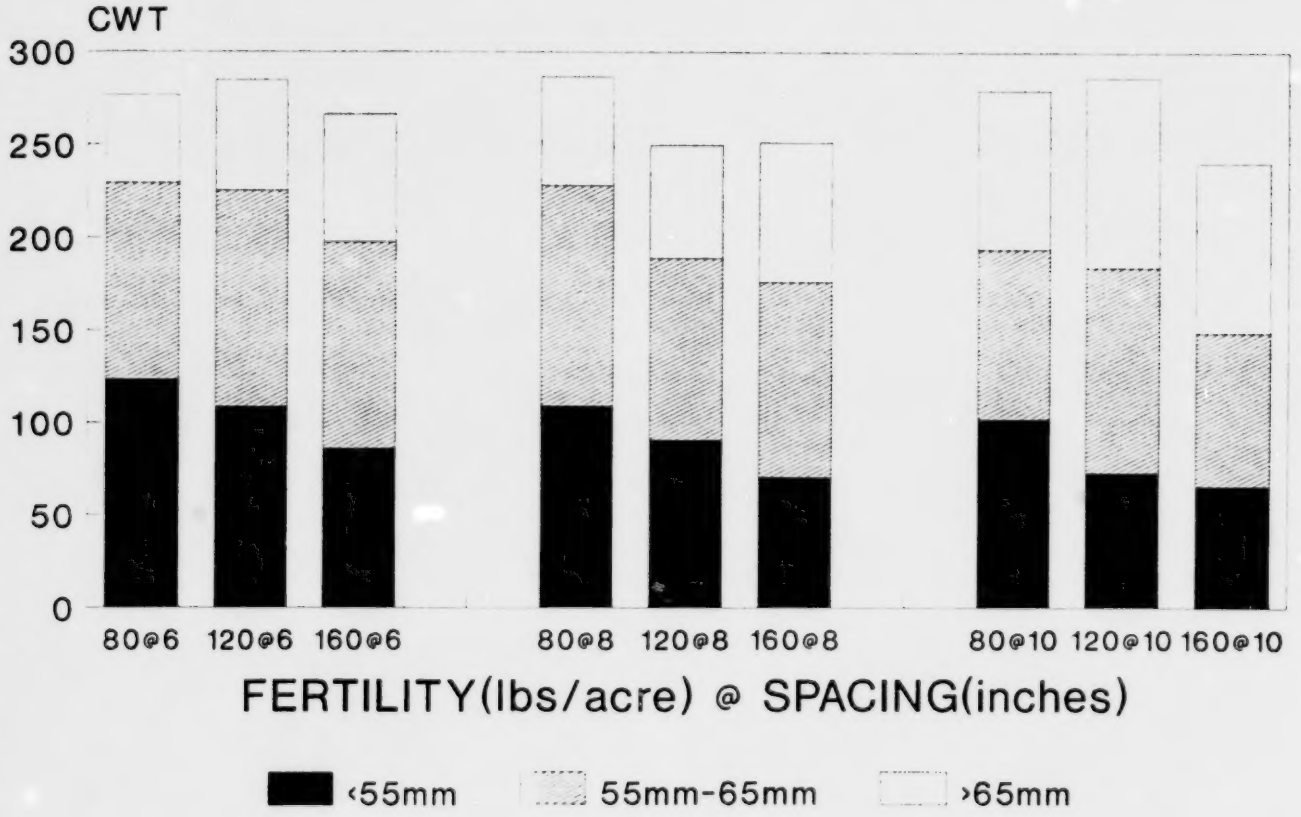
RHINE RED(GROUPED BY SPACING)
1988 VARIETY MANAGEMENT AND EVALUATION



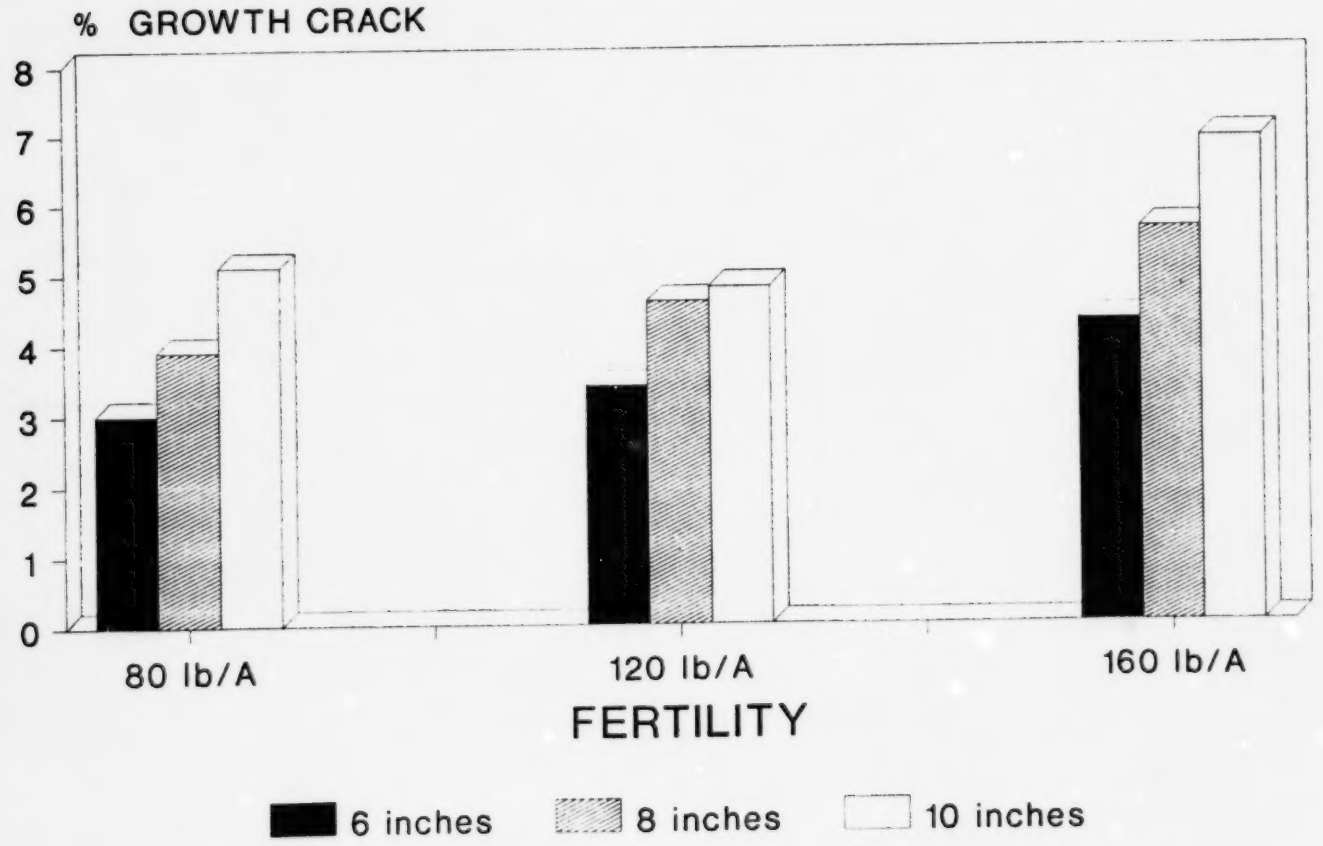
VIKING(GROUPED BY FERTILITY)
1988 VARIETY MANAGEMENT AND EVALUATION



VIKING(GROUPED BY SPACING)
1988 VARIETY MANAGEMENT AND EVALUATION



% GROWTH CRACKS



CONCLUSIONS

It is dangerous to draw conclusions based on the results of a single year's data therefore the following spacing fertility combinations must only be considered as an indication and not necessarily the optimum for each cultivar.

The results of the first year indicate that the following combinations of fertility and seed spacing resulted in the highest total and marketable sized tuber yields:

	FERTILITY (LB./A)	SEED SPACING (IN.)
Alpha	80	8
Atlantic	80	10
Bintje	80	8
Brador	80	6
Chieftain	80	6
Kennebec	80	6
Red Gold	80	10
Red Pontiac	80	8
Rhine Red	80	6
Viking	80	6

As indicated on the graph, the general trend with respect to incidence of growth cracks was quite apparent. The closest seed spacing of six inches and the lowest rate of applied fertility, 80 lb./acre N-P-K produced the least number of tubers affected.

The potential benefits of applying a level of nitrogen fertility in particular which does not exceed the required level to a seed potato crop are numerous. They include;

- -earlier tuber set sizing, and plant maturity
- -potential benefits of mature plant resistance to virus infection and is particularly important in controlling the spread of leafroll virus
- -reduced skinning and bruising
- -increased storeability
- -reduced tuber defects such as growth cracks
- -easier and more efficient topkill
- -reduced fertilizer cost

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